Stormwater Advisory Board (SWAB)
March 2, 2012; Friday, 3:00 PM
SWAB Meeting Minutes
W.A.T.E.R. Center, 101 E Pawnee, Wichita, KS

Present: Chris Bohm, Chair; Hoyt Hillman, Vice-Chair; Jim Weber, 2nd Vice-Chair; Larry Henry, Member; Joe Pajor, Member; David Leyh, Member; Richard Basore, ex-officio Member; Jeff Bradley, Member; Gary Oborny (arrived 3:15 pm), Member; Scott Lindebak, Support Staff; Colleen Shirley, Secretary
Others: Joseph Mayans, Senator Jerry Moran's Office; Joe Hickle, PEC; Tom Stiles, KDHE Bureau of Water; Jim Hardesty, PW&U Storm Water; Don Henry, Interim Assistant Director PW&U; James Clendenin, Council Member District III **Absent:** MS Mitchell, Member

Regular Agenda

I. Welcome and Call to Order

Quorum requirements met, meeting called to order at 3:07 P.M. by Chris, SWAB chair.

II. Review and Approve/Revise Minutes from February 3, 2012 Meeting

Chris pointed out a quorum was not present on February 17th, so the February 3rd minutes are the ones being reviewed for approval. As a point of order, Chris informed the Board Colleen already mentioned there were several typos to be cleaned up.

i. Motion by Jim: approve minutes from February 3rd meeting; seconded by Hoyt.
ii. **Vote:** All members in attendance approved, no members opposed and no members abstained. **The motion passed.**
iii. Resolved: The minutes, of the February 3, 2012 meeting are approved and entered into the SWAB records.

III. Review Notes from February 17, 2012 for Comment

Chris notified the Board notes from the February 17th meeting were available for review, however as the meeting was not 'official' he was uncertain as to any formal action to take. He suggested a motion to add the notes to the records.

i. Motion by Joe: receive and file notes from the February 17, 2012 meeting; seconded by Hoyt with an additional comment; Colleen did an outstanding job of recording difficult wordage and the message was very well stated.
ii. **Vote:** All members in attendance approved, no members opposed and no member abstained. **The motion passed.**
iii. Resolved: The record (notes) of the February 17, 2012 meeting is received and filed into the SWAB records.

IV. Sub-Committee Reports

i. **O&M Committee** (Larry, Jim and Richard)

Jim offered information independent of what is being done here; Spirit Aerosystems has been working on a building under construction. They had assembled their own O&M Manual as they are supposed to and went to the County Register of Deeds Office (*hereafter referred to as RODO*) to file it and was apparently the first time this has been attempted. After conversation in the courthouse it was determined the RODO can only file items accompanied by a notarized document. If there is some type of notarized statement with the O&M it can be filed through the RODO. He stated it doesn't necessarily answer the question if it's the 'best' thing to do or not, but it's an option. We would be able to track these by filing a notice with the RODO and attaching a description of the property that it applies to. In summary, these can be legally filed and it's something to discuss. Jim stated he would work with Scott and further discuss these ideas with committee members. He said his main concern and maybe the bigger problem is the County might do one that will later be annexed into the City, so he's unsure if it should be filed in multiple locations or what, something more to discuss.

Chris said he knows in the petition process; for example streets in a community, with a new plat you file a certificate of petition. It says 'petitions for these improvements

have been submitted and may sometime be charged against your property' and it's notarized and is carried with the Title of the property. If the Title is transferred there is a notation the petition exists. He suggested something similar may work for the O&M. The Board will still need to talk about where to store it.

ii. **Liaison Committee** (Jeff, Gary and Hoyt)

Jeff mentioned he, Larry and Scott attended the Stormwater Quality Seminar hosted by KDHE last Thursday in Topeka. There were several very good topics brought up; NOI, MS4 Permit and current directions of the point of views/point of entry. Jeff said there was a lot of good discussion between the attendees and KDHE, he took notes and he will try to scan and distribute them to the Board.

Hoyt mentioned he also attended meetings; both the R.E.A.P. (Regional Economic Area Partnership) meeting and the Just Add Water conference held at the Sedgwick County Extension Center last Wednesday. He said they heard a lot of 'conservative' approaches and risk management presentations from petroleum professionals assuring everyone in the crowd there weren't any problems.

Jeff asked if that referred to the pipeline. Joe responded it was on horizontal fracking.

iii. **Downstream Channel Protection Committee** (Chris, Scott, Jeff, Hoyt and Mitch)

Chris referred to a tour of a few localized channels taken last week and asked Hoyt to update the Board. Hoyt responded he would and said he also expected Scott to add information as he has prepared a small picture presentation to share with the group later in the meeting. The tour was attended by Hoyt, Scott and Becky Lewis from Environmental Health, who is working with the WRAPS organization, and said he believes Scott is actually the contact focal for the RiverCity WRAPS. It was decided to do some stream restoration work on the Gypsum so the tour enabled them to identify areas that needed work. It took a couple of hours and they learned a lot.

Chris thanked Hoyt for the information then inquired of Scott if he understood correctly that Scott had made advancements on the GIS mapping for sensitive watershed areas. Scott said he had not.

V. Presentation – Tom Stiles, KDHE and Jim Hardesty, City of Wichita Stormwater

Jim H began by introducing himself as part of Scott's staff, the Water Quality Specialist for the City for the past 16 plus years; with specialties in chemistry and biology of water. (He explained Scott's staff also includes; Mark Hall, who focuses on compliance enforcement and Tim Davidson, an engineer.) He stated he would briefly go over where the outfalls are, when they sample them, what they sample for and then Tom will go into topics as to why.

<NOTE from the secretary: At this time a Power Point Presentation entitled "City of Wichita NPDES Wet Weather Sampling Program" was started. As much of the information during this presentation involves graphs and mapping pointed out on the screen and would not be easily translated into the minutes, the power point has been attached for your review. If you would like a copy of the recording for this presentation, please contact me and I will forward it to you.>

The Who, What, Where section of the presentation covered the following:

- Sampling is mandated by the NPDES permit
- Samples were originally taken from 4 sites, currently there are 8 sites
- Sites are commercial, industrial and residential
- Samples are (ideally) taken 4 times a year, seasonally and only at outfalls
- Types of samples: First Flush, Composite and Upstream
    - First Flush = initial 30 minutes of when runoff begins
    - Composite = done periodically over the next 3 hours (i.e. every 20 minutes)
    - Upstream = sampling added by the City which is above and beyond the permit requirements in order to have a better of understanding of what the receiving stream looks like

The Wichita Stormwater Wet Weather Sample Location Map and subsequent individual maps of the following locations were included: Huntington & Armour, Towne East & Armour, McLean, Broadway & Arkansas River, Little Arkansas River & Hood

Street, 13th Street North & North River Boulevard, Cowskin Creek & Harvest Lane as well as Cowskin Creek & West Maple. Jim H commented people would be surprised at the amount of bacteria people and cars make, carry with them and deposit in other locations.

2011 TMDL Sampling Results at Outfalls

- Only 3 samples were taken (instead of 4) due to the lack of rainfall
- Samples were taken in May, August & November
- Graphs of sampling results attached

The following graphs were shown on the screen and are attached as part of the presentation from Jim Hardesty:

- BOD (Biological Oxygen Demand), Jim commented the Cowskin Creek appears to be the 'problem child' area and it will be a general theme throughout the charts.
- Total Phosphorous
- TSS (Total Suspended Solids), Jim noted this is a very important issue for this group.
- Total Nitrogen, Jim pointed out the Cowskin was way above the Little Ark average.
- E.coli bacteria. Jim stated this was a difficult measurement because the samples exceed the testing parameters.

Jim H summarized his presentation, reminding the Board he covered the Who, What and Where of City of Wichita Wet Weather Sampling. He asked everyone to remember the difference between outfalls the City samples by the permit and the overall view (streams/rivers) Tom will present. Jim stated they would take questions after Tom finished as both presentations went hand in hand. At this time, he turned the meeting over to Tom Stiles.

Tom began by thanking the Board for inviting him to come and describe their ongoing monitoring in and around the City. He introduced himself as Tom Stiles, head of KDHE's TMDL (Total Maximum Daily Load) Program. He briefly reviewed their history with the City of Wichita and mentioned they have a good relationship in regards to what they are trying to accomplish with both storm water and waste water. Tom said what he is hoping to do is describe what they see predominantly on the Big and Little Ark Rivers. He said Cowskin Creek would be left for another day, as Jim is right in saying it is a problem child, as Cowskin has a 'whole host of problems in and of itself' especially if scales is something of concern for the storm water program. Tom commented there are a whole host of factors that go into what influences the water quality.

Tom pointed out they have stations all through the area; Maize downstream to Derby, Valley Center, Wichita, Bel Plaine etc. He said they have a fairly robust network within the City and it doesn't include some of the 'special' study sites. They have a good data center for general long-term conditions in terms of water quality relative to streams in and around the City.

<NOTE from the secretary: At this time a Power Point Presentation entitled "KDHE Sampling on Arkansas River at Wichita" was started. As much of the information during this presentation involves graphs and data pointed out on the screen and would not be easily translated into the minutes, the power point has been attached for your review. If you would like a copy of the recording for this presentation, please contact me and I will forward it to you.>

Tom said his program was predicated on 'loads' even though water quality is typically expressed through concentration. Because it is 'load' hydrology comes into place for them. When looking at water quality, they see different things happen and different contributions occur depending on wet or dry conditions. He pointed out 1990 is the 'anchor point' for most of the water quality data throughout the state. Tom stated they were blessed to have a lot gauges located on the rivers and streams operated by USGS as well. He went over some background information and comparisons of different locations.

Several charts/graphs were used during the presentation (per secretarial note above) and they are listed here:

- 1990-2011 Percentile Flows – chart includes; Maize Valley Center, Wichita and Derby (comment by Tom regarding Valley Center, Little Ark 'huge' contributor in terms of what its influence is on the Big River through Wichita and downstream)
- Period of Record Averages for TP & TSS – chart includes; Maize, Valley Center, Wichita, Derby & Oxford (Side note from Tom: they predominantly focus on Phosphorous as Nitrates are tough/tricky to get a handle on. Nitrogen tends to be more an energy intensive nutrient in terms of trying to remove it and "school is still out" regarding the impact on fresh water systems. The rule of thumb has always been fresh water is driven by phosphorous and marine water tends to be driven by nitrogen (Gulf of Mexico). Studies now show that may not be the case as there is melding between the two. From a management perspective; phosphorous is the one they believe they can get a handle on; so there is a tendency to downplay the nitrogen end.)
- Flow Condition Averages for TP & TSS – chart includes; Maize, Valley Center, Wichita, Derby & Oxford
- Arkansas River TP at Wichita over Time – chart includes; Derby & Maize
- Arkansas River TSS at Wichita over Time – chart includes; Derby & Maize
- Arkansas River TP versus Flows at Wichita – chart includes; Derby & Maize (Tom commented one questions he is often asked; is the water cleaner leaving the City than it is coming in. When it comes to phosphorous, generally the answer is "no" but that does not necessarily mean the City is the cause of it.)
- Arkansas River TSS versus Flow at Wichita – chart includes; Derby & Maize (Continuing the above comment, for TSS it's not as clear; sometimes yes and sometimes no. Tom said one thing he hasn't touched on is 'load'. Load is the product of between concentration and flow. Little Ark is a gaining stream. Even when there are comparable concentrations, because of the increase in the flow – and flow tends to drive load more so than concentration – the loads that are leaving the City tend to be much higher than those entering into the City. Concentration wise there may not be all that much differentiation but there is contribution going on there.)
- Derby versus Maize TP
- Derby versus Valley Center TP
- Derby versus Wichita TP
- Derby versus Oxford TP
- Derby versus Maize TSS
- Derby versus Valley Center TSS
- Derby versus Wichita TSS
- Derby versus Oxford TSS
- Wichita Area TP in 2006 – chart includes; Maize, Valley Center, Wichita, Derby & Oxford
- Wichita Area TSS in 2006 – chart includes: Maize, Valley Center, Wichita, Derby & Oxford
    - NOTE: 2006 was a very dry year.
    - NOTE: 2001 was a very wet year.
- Wichita Area TP in 2001 – chart includes; Maize, Valley Center, Wichita, Derby & Oxford
- Wichita Area TSS in 2001 – chart includes; Maize, Valley Center, Wichita, Derby & Oxford

The power point ended and Tom continued with his presentation, saying there are a few things he would hope the Board would consider. One of which is looking at the notion of load contributions as flow comes into play there. He reminded the Board he agrees with Jim H regarding the Cowskin Creek being a 'problem child' and the Board is probably aware of the nuisance it causes just from the flooding perspective. Tom answered the "why" relating to these items (from Jim's presentation with 'what', 'where' and 'when'). The 'why' is concern on the impact of aquatic life within the state and within the resources of the Ark Valley. TSS might influence the condition of aquatic life or aquatic insect communities; these basically represent good quality water and are

impacted by TSS or sediment, probably more so than any other pollutant. On the nutrient end, there is no question Kansas' fresh water has too much phosphorous and we are taking steps for reduction. Another issue and bigger concern is what we are passing onto Oklahoma; almost every stream in Kansas flowing south in the Ark Basin, winds up in an Oklahoma reservoir. Tom stated they've taken the philosophy of working in good faith toward reducing our contributions to our downstream neighbor(s). He added the Clean Water Act expects that of us; it's basically outlined the upstream states cannot cause a downstream state to violate that state's water quality standards. At times this issue can erupt into litigation. Oklahoma has taken a rather benign approach with us, up to this point, partly because we have shown evidence of trying to address our end of the equation. From the EPA perspective they are focused on influencing downstream waters and crossing over interstate as that is where they start to engage in conversation of how one area potentially influences something in downstream and how it can be protected. Tom said they have flagged rivers in Kansas for TSS and phosphorous, but they are not yet ready to "pull the trigger" in developing TMDLs regarding these. He said they want to see where the MS4 program is going and stated they want to work with the City on waste water reduction and not jump into the TMDL perspective yet. Conversely, up in the Little Ark they are going to do a phosphorous TMDL and TSS TMDL, as much to inform the WRAPS group and help them identify where they should be targeting but also to engage Newton and McPherson MS4s in order to 'drive home' the purpose of what they are trying to accomplish with their programs as they influence the surface water supplies of the Little Ark and by extension, the Little Ark. Tom said one area he didn't really go over was bacteria; it is a lot like nitrogen regarding in it is difficult to get a handle on, how to deal with it short of disinfection or, in some cases, long-term retention. He mentioned the intense sampling from Colorado state line to the Oklahoma state line shows the Ark is still susceptible to episodes of high bacteria. On the storm water end, based on what the American Society of Civil Engineers' database and evaluations of BMPs, there isn't any practical method that "knocks down" bacteria. Their recommendations have been looking at flow and volume reduction as a means to lower those levels. He added, anything they can do to extend the retention of those bacteria laden waters allows for greater contact time for die out, tends to work for benefiting the larger rivers.

Tom offered to Scott and Jim an opportunity to schedule another meeting, after this one, to discuss where the MS4 is going, re-tooling its own long term perspective. He stated they have over a decade of data contained within the City files and it's time to look at that information and use it to craft some decisions of how/where/when to sample in the future. He said we need to get out of the mindset "we are doing this because we HAVE to do this because the permit tells us to" and do it more from the perspective of the environmental payback of us to make the advancements. Tom said they would engage with the RiverCity Wraps and would also be happy to engage with SWAB at any time to get deeper on this subject and go into further detail on items, such as the Cowskin.

Chris thanked Tom and asked the Board if there were any questions.

Joe interjected they (the Board) should recognize Council Member Clendenin from District III joined the meeting today. On behalf of the Board, Chris welcomed Council Member Clendenin.

Gary asked Tom if there was test data that _____ the sewer flow from this data in enable to pin down what is really coming off storm water versus other items that may need to be addressed some other way. Tom replied the City has two data sources; they are required by NPDES permit to sample (daily) their waste water for a variety of things, then also what Jim has collected from the outfalls (depends on where the outfalls are) after a decade or more, he has a sense of what the typical quality of the storm water tends to be; generally high bacteria and somewhat low TSS.

Jim H commented he missed the first part of the question and asked was it based on a sanitary sewer. Gary responded yes, so we can take a look at the storm water as that is what we really should be looking at. He clarified his interest is in the data coming from the storm water versus when we have data with the sewer _____ put in there as well. He stated we are dealing with storm water and we should be isolating the issue and really focusing on that to determine; what is our true impact into the river without these other items. If we have to deal with storm sewer situation, that is another

item. Tom replied, they could grab the City's data from 2001 to 2006 condition and add it to show what its contribution is relative to the other stations. It should help glean out what is storm water and what is waste water.

Chris asked Tom if they regularly monitor other streams in Kansas that do not have the influences of communities between a reach of upstream section and a downstream section. If you do, is it 'dead on' flat numbers or is the width or accumulated area at any specific point given highs and lows for the phosphorous and total suspended solids. Tom said yes, they are all over the place, both larger streams and tributaries. He expanded by saying they have a real "mosaic" in terms of their network coverage. In terms of what they see in other areas, the general rule of thumb for our streams is good water quality comes from drought. If there is a municipal waste water treatment – secondary treatment they take care of any problems, generally no problems. He said they didn't have much non-point contributions as there is no run-off. He said their problems, whether; bacteria, sediment or nutrient loading have always been generated by high flow rate. You'll see flat through dry and normal flows, then an immediate trajectory upwards once we get into high flows. He went on to say there are two distinct conditions out there which influence/describe the water quality we typically see. When you have a large waste water treatment plant, in and of itself it begins to assert its own impact there. Both positive, as we saw with TSS, as well as detrimental impacts in terms of what nutrient levels it has.

Jim W wondered if testing was occurring in other urban areas of the state where they have seen, over a long period of time, water quality improvements in the watershed; if improvements have actually changed the data. He wanted to know if they could pinpoint any water quality measures that had been taken and if it was working and if the data actually showed it was working. He commented he thought it would be hard to show... Tom replied it is hard. Fuzzy and murky are good words to describe it due to the "noise" in the data; it is difficult to distinguish what sources might have contributed or what impact the interventions might have had. He added the best interventions they have had are the point sources where things are in a much more steady state type of situation and we can see definitive signals in terms of improvement. He said 90% of the improvements with water quality have been through point sources because of investments in waste water treatment. Jim followed up; looking at the City's testing sites they are all in areas developed the day they started testing...they have a decade or more of records, but do they seem steady over time or random. He said it's a great testing site but asked is there a way to tell if we need to do something to change the water quality.

Jim H answered random and fuzzy are a couple of good descriptions and he offered Towne East parking lot as an example. You would think the area would be pretty steady, but even something as simple as the length of time between rain events has an effect. Stuff accumulates and affects what you find in the outfall. If the temperature is hot or cold, windy etc are all examples of this 'nefarious web', it's hard to pinpoint because of all the factors. Tom replied regarding the second part of the question, the biggest influence in us being able to see something is scale. If we get into a relatively small watershed where they can actually direct resources to influence what's going on in the landscape, we could see a signal. If you balloon that out into something like the Little Ark or the upper reaches of Cowskin heading out to western Sedgwick; we lose control of that simply because we don't have the ability to influence every parcel of land lying out there. Jim H added they do not have the ability to control the variables. Jim W (using the Towne East parking lot example) asked if we were doing BMPs might we be able to measure the difference over time. He also mentioned he had attended another meeting earlier this week and had forgotten how big the Little Ark basin was. Tom mentioned Jim W raised an excellent point in that if you look at their track record with MS4 permits, it's pretty spotty. Why? Because storm water is not as big of a deal to us as it is on the coast. We have islands of density but we don't have widespread regional high density development. We have islands of development surrounded by an ocean of rural land; some of it is grassland which is beneficial and some is cropland which can have detrimental impacts.

David commented on the Towne East parking lot; it is greatly influenced by the influx of the vehicles that bring the material onto site, they have a great impact. Towne

East is the largest shopping center in the entire City, depending on how much that parking lot is loaded, those vehicles bring a lot of material onto the property which gets washed off and get into the outflow. He said if you eliminated the vehicles and just looked at the site; it would be a totally different output. If you take a look at the impact of all the vehicles, they are coming from rural areas (i.e. Butler County, pick-up trucks with fertilizer, oils etc) they have an impact. Jim H remarked it was like he said earlier, it's impossible to try and control the variables. David agreed and said you can't. He continued, that one test site has more variables than possibly every other test site as the others would probably be more standardized.

Jeff observed multiple factors affect outcome. With Cowskin there are soil types, the gradients, pools, a lot of bio-mass, backwater etc and land use. Looking on the east side there is shale, fish in Gypsum, etc. He asked if there was data (as far as nutrient loading) prior to the 2004 opening of the Water Reclamation Facility (Water Treatment Center) which feeds into the Cowskin. It's not at full capacity yet, but he would like to know what the levels were before it opened and after as far as the Cowskin. Jim H said he was trying to remember when he started sampling the Cowskin but couldn't really remember if it was before 2004 and if so, how long before but said he could find out.

Gary asked Scott if Learjet was the first location to have BMPs under the new ordinance. Scott said no, they had a dry pond they used as part of their detention but he did not believe it was the first BMP, he believe it was a pre-existing BMP. Gary said it would be nice to have a list of all sites that have BMPs since the change in the ordinance and then discuss possibly testing the sites to see if we are getting any results from the BMPs we have been putting in place. By obtaining this data we can determine if it is effective or not. Jim H stated they have addressed that topic; they have a Plan A, Plan B and Plan C, a menu of different places they would like to incorporate into their sampling program. He mentioned the permit is up for renewal in September this year; they (Scott, Jim H, Tom and others) will be meeting to go over the data they have and reviewing the other sampling options and commented he agrees with Gary – they've monitored Towne East a lot and now it's time to move to other, wiser locations.

Hoyt (speaking to Jim H) wondered if in the case of the Cowskin it is in essence what they have already. We already see the high spikes because of sandy soil, intermittent basins throughout, great at absorbing water until a major storm then you get the carry on and the wash off of the bacteria coming of the top and flowing downstream. He added as Tom said, it's a matter of time for breakdown and time seems to be the advantage. Hoyt asked if there was any other detention process we could use to help or encourage the breakdown of materials while they are sitting on the sand on the fairly high porosity soil. Jim H clarified if he meant buffer strips, detention ponds, that kind of thing. Hoyt said sure; swales, whatever. Jim H said yes, he thinks the menu of BMPs is pretty well established and is in our stormwater manual, even the effectiveness ratings. He said, if he understands Hoyt's question, the problem is there are a lot of places we cannot go in and force BMPs to be in place. We can't go into someone's private yard and force them to put in a swale. We do have effective BMPs and we know what level they are or are not effective, but there are only so many things we are permitted to do. Hoyt agreed but said we know the outcome of the process we were just discussed. Jim H said it was like rain gardens; it is something people can do on their own and they can be convinced to do that, but it's harder to convince them to put a swale in their back yard. Hoyt said it was a different situation on the east side where they have clay.

Jeff commented he understood the feds have proposed about $2 billion to farmers for conservation efforts, but because of the price of crops it isn't worth it. They will still plant everything they can because it pays better. Trying to bring in those things can be difficult simply based on economics. Jim H added and aesthetics, most people do not want a wetland in their backyard.

Chris thanked Tom and Jim H for their time and for the informative presentation. He commented we would probably invite them back at some point to get deeper into some of the conversation, especially regarding the effectiveness of BMPs on specific sites.

VI. Review Revised Response Letter to Poe & Associates

Chris reminded the Board the letter has been reviewed before and the couple of slight changes requested have been made. He pointed out the changes made and stated the character of the letter is the exact same as before with Colleen making grammar and punctuation changes. Chris said they could discuss or make a motion to accept the letter, enabling him to print, sign and forward it to the Director of Public Works for his consideration in response to Poe & Associates.

i. Motion by Hoyt: approve the response letter and forward to Alan King; seconded by Jeff.
ii. **Vote:** All members in attendance approved, no members opposed and no members abstained. **The motion passed.**
iii. Resolved: The response to the letter from Poe & Associates will be printed (by Colleen) and prepared for Chris' signature.

VII. Distribution of the draft Floodplain Management Ordinance for review/comment

Scott stated he was not able to complete this but would like to e-mail it to the Board next week for their review and comment.

ADDITION TO THE AGENDA – continuation of Downstream Channel Protection Committee

Scott provided photos from the tour. He reviewed them on the screen and gave detailed explanations as to what they observed. *<Note from the secretary: As the pictures are not available for the minutes, the discussion of the pictures is not included here. Please contact Scott if you would like a copy of the photos and/or contact the secretary if you want a copy of the recording.>*

VIII. Next Business Items

Gary suggested Phil Barnes and others come to a meeting and speak on different parameters with their testing and results in regards to water quality of the river as well as a presentation of the economic impact so the Board can begin to look at the cost to the City in regards to tax revenue and things of that nature. With this information we can begin to gauge what items the City may want to address in order to save money. Chris asked if Mr. Barnes would be available at the next meeting. Mr. Barnes (in the audience) stated he would be available. Gary stated he would invite others and provide the names to Colleen.

Chris (speaking with Scott) stated Joe H provided information at the last meeting in regards to storage volumes potential, maybe doubling up volumes. He asked if that was something we should follow-up on at the next meeting. Scott replied yes, he is hoping to follow-up on that during the next meeting. Chris said ok then asked Scott if he would be distributing the Floodplain Management Ordinance for the Board's review prior to the next meeting and if he wanted a block of time to go over it. Scott answered he might need ten minutes.

Gary asked if we could get a delivery estimate on the BMP sites. Chris asked Scott if it would be possible to get that information and Scott said yes.

IX. Adjournment

i. Motion by Hoyt: adjourn the meeting; seconded by Jim.
ii. **Vote:** All members in attendance approved, no members opposed and no members abstained. **The motion passed.**
iii. Resolved: The March 2, 2012 SWAB meeting is adjourned.

NEXT MEETING 03/16/12

City of Wichita NPDES Wet Weather Sampling Program

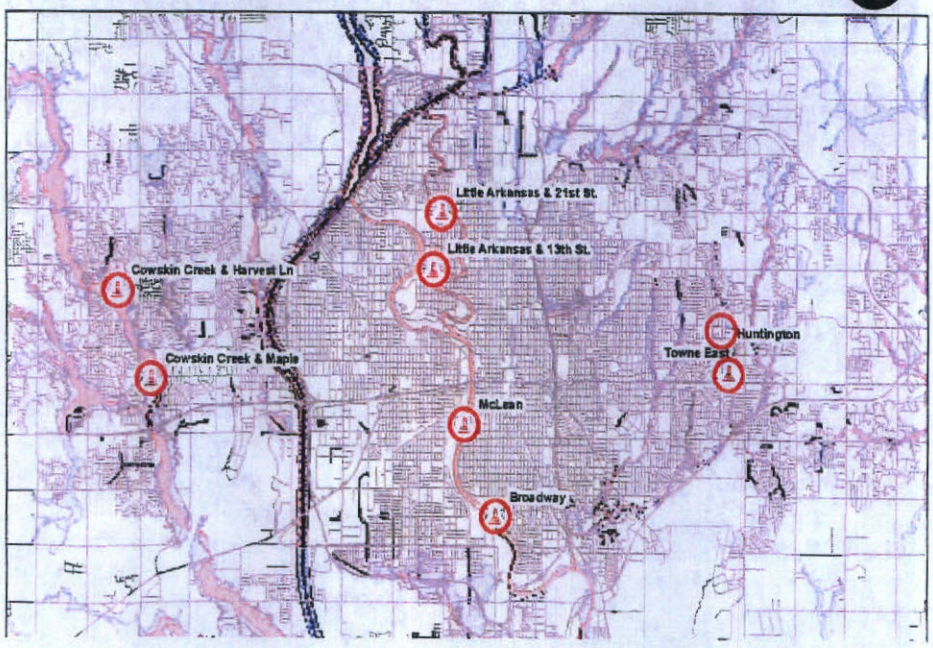
SWAB Meeting March 2, 2012

Jim Hardesty

Who, What, and Where

- Mandated by NPDES Permit
- Originally 4 sites, currently 8 sites
- Commercial, Industrial, Residential
- Seasonally, and Only at Outfalls
- First Flush, Composite, Upstream

Wichita Stormwater Wet Weather Sample Location Map

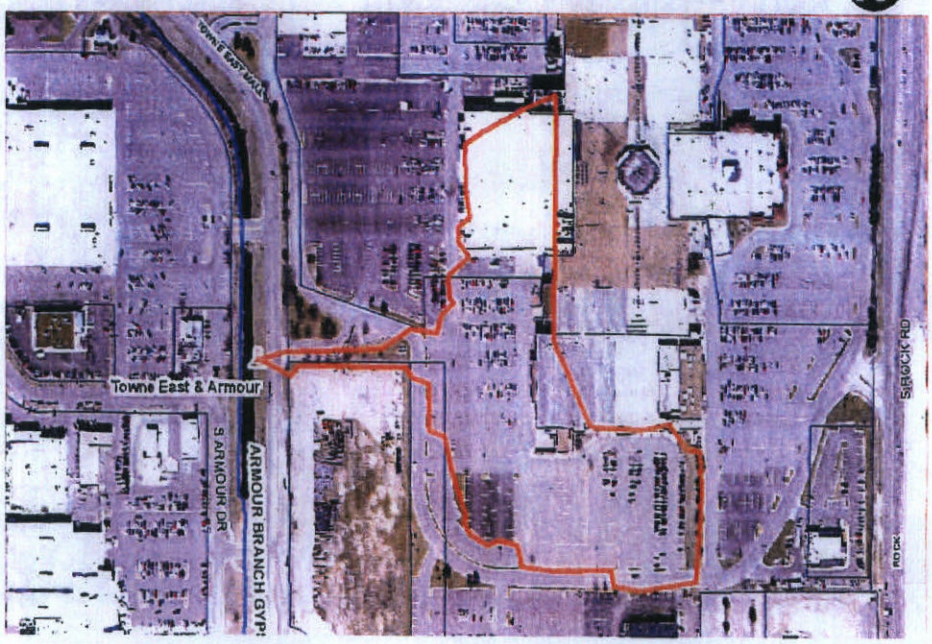


5.2 acres

Huntington & Armour

62.7 acres

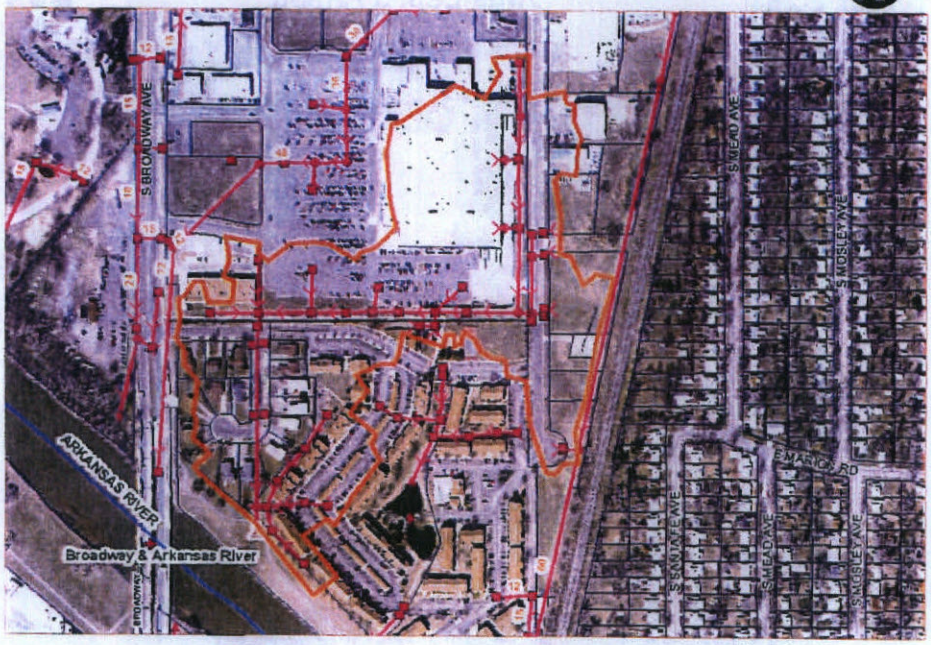
Towne East & Armour



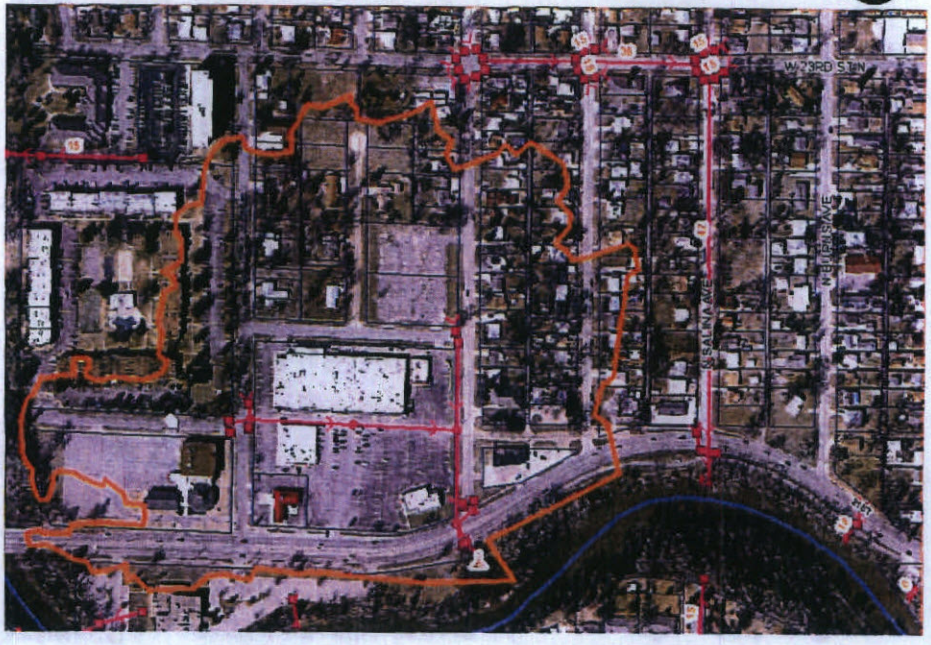
11.8 acres

McLean

26.5 acres Broadway & Arkansas River



34.1 acres Little Arkansas River & Hood St.



3/2/2012

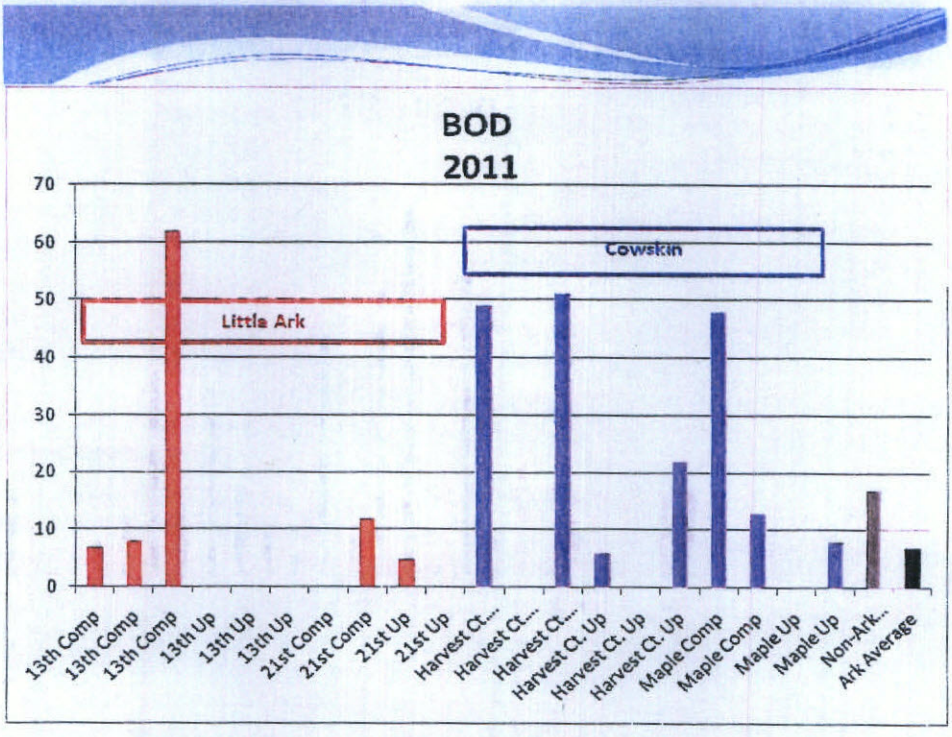
20.4 acres 13th Street North & N. River Blvd.

16.9 acres Cowskin Creek & Harvest Lane

89.2 acres Cowskin Creek & W. Maple

2011 TMDL Sampling Results at Outfalls

- Lack of rainfall restricted sampling events to 3 instead of 4
- Samples taken in May, August, and November
- What follows is not a detailed analysis of sampling data, I will leave that to Tom Stiles, but it is a primer on City sampling activities


BOD
2011
70
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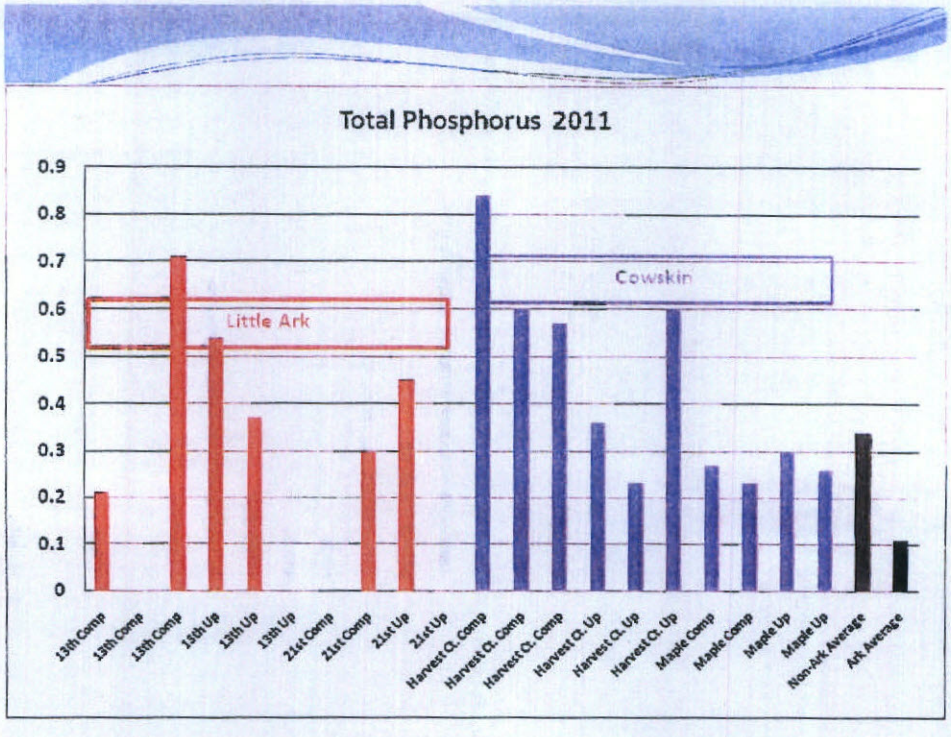
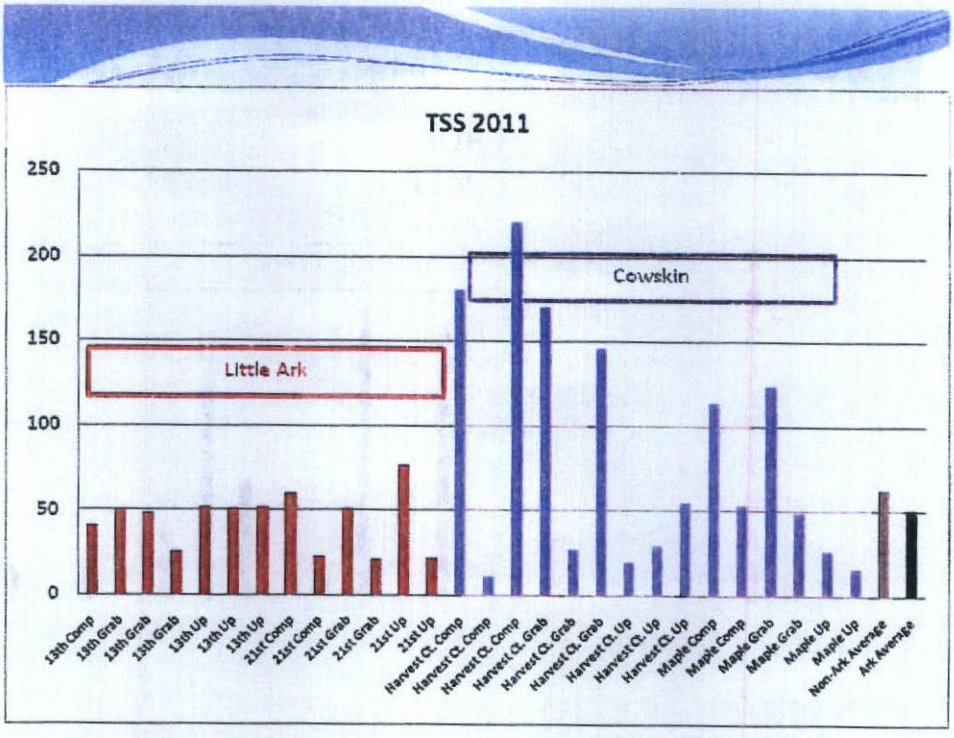
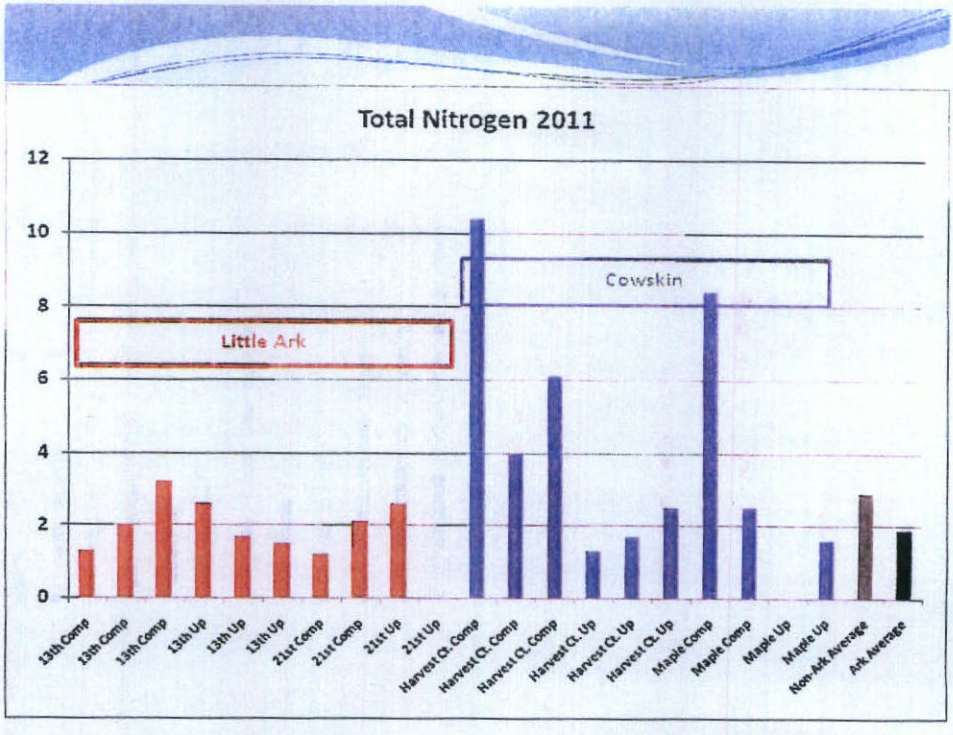
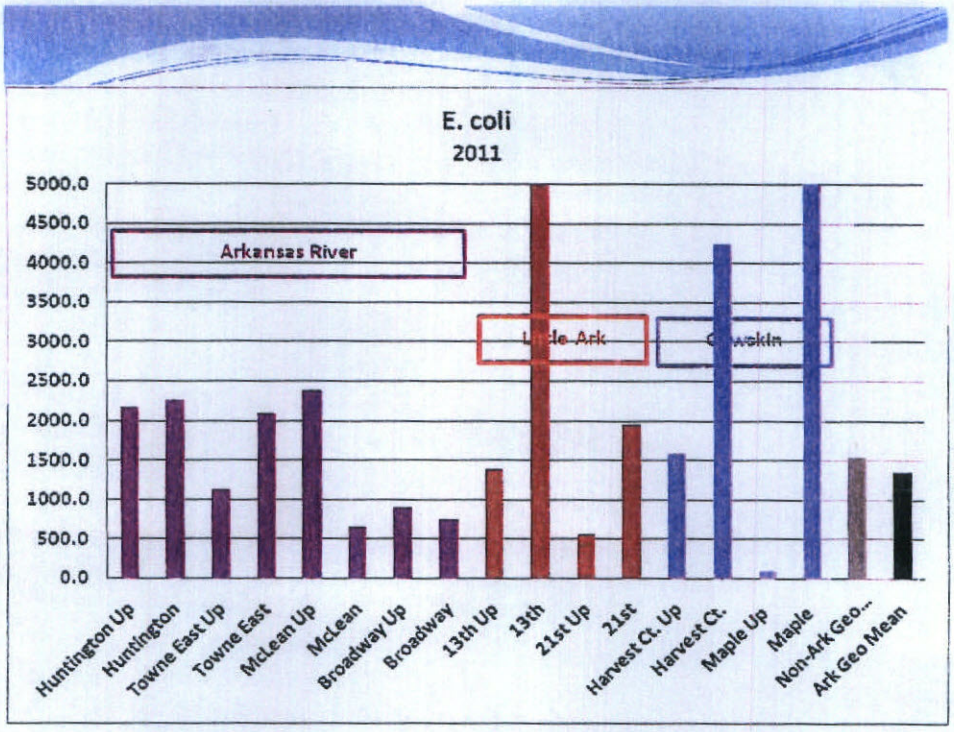
10
0
Cowskin
Little Ark
13th Comp
13th Comp
13th Comp
13th Up
13th Up
13th Up
21st Comp
21st Comp
21st Up
21st Up
Harvest Ct...
Harvest Ct...
Harvest Ct...
Harvest Ct. Up
Harvest Ct. Up
Harvest Ct. Up
Maple Comp
Maple Comp
Maple Up
Maple Up
Non-Ark...
Ark Average

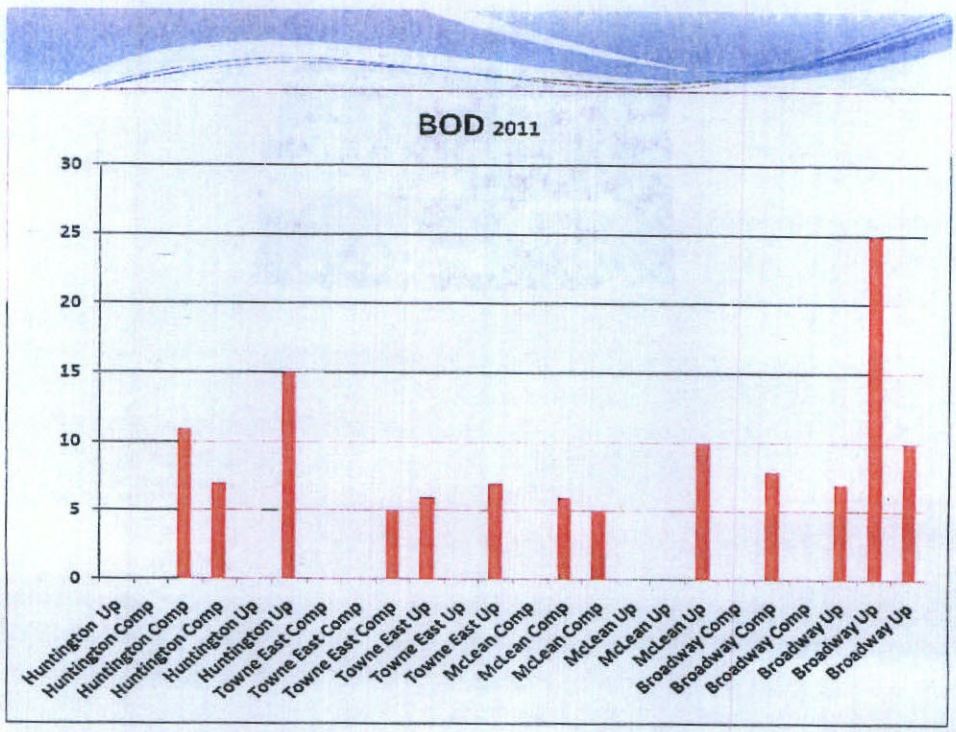

Total Phosphorus 2011
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Cowskin
Little Ark
13th Comp
13th Comp
13th Comp
13th Up
13th Up
13th Up
21st Comp
21st Comp
21st Up
21st Up
Harvest Ct. Comp
Harvest Ct. Comp
Harvest Ct. Comp
Harvest Ct. Up
Harvest Ct. Up
Harvest Ct. Up
Maple Comp
Maple Comp
Maple Up
Maple Up
Non-Ark Average
Ark Average

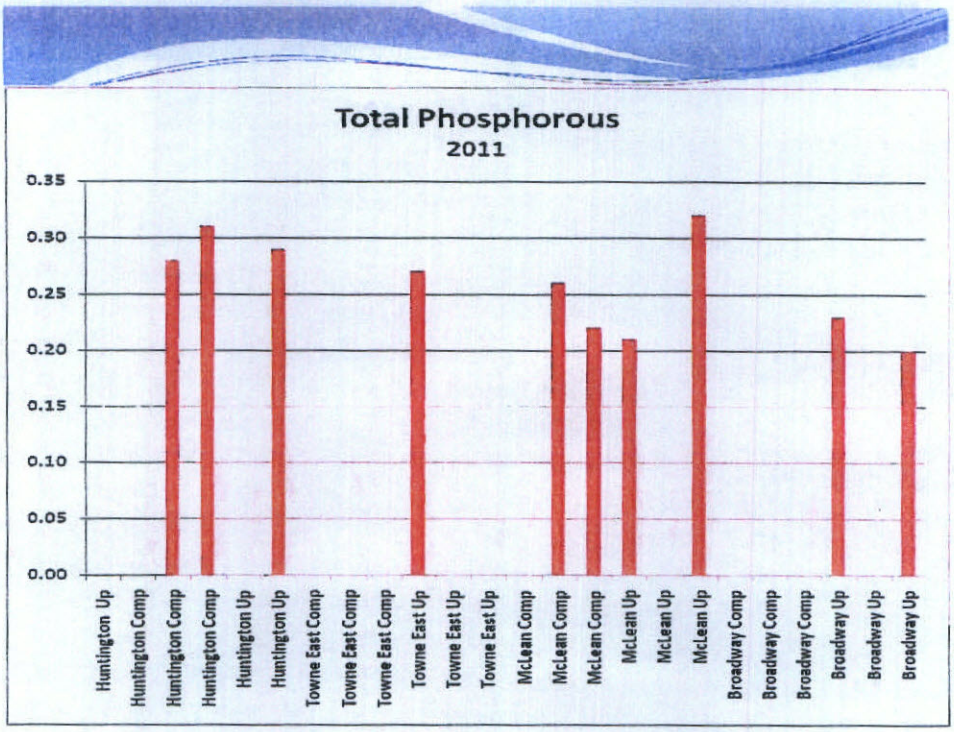

TSS 2011
250
200
150
100
50
0
Cowskin
Little Ark
13th Comp
13th Grab
13th Grab
13th Grab
13th Up
13th Up
13th Up
21st Comp
21st Comp
21st Grab
21st Grab
21st Up
21st Up
Harvest Ct. Comp
Harvest Ct. Comp
Harvest Ct. Comp
Harvest Ct. Grab
Harvest Ct. Grab
Harvest Ct. Grab
Harvest Ct. Up
Harvest Ct. Up
Harvest Ct. Up
Maple Comp
Maple Comp
Maple Grab
Maple Grab
Maple Up
Maple Up
Non-Ark Average
Ark Average

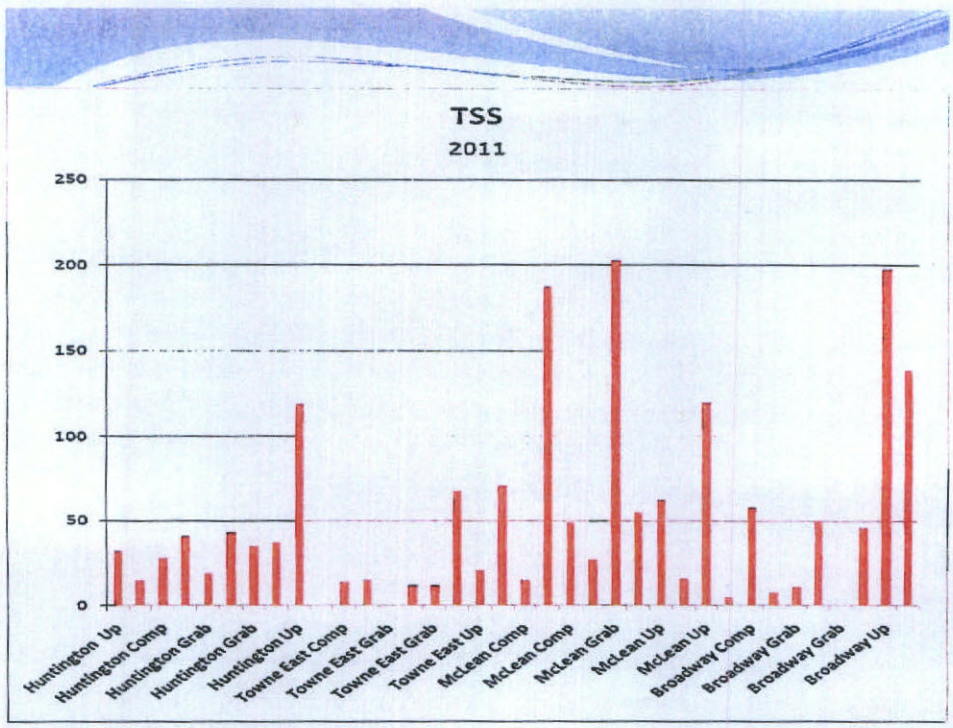

Total Nitrogen 2011
12
10
8
6
4
2
0
Cowskin
Little Ark
13th Comp
13th Comp
13th Comp
13th Up
13th Up
13th Up
21st Comp
21st Comp
21st Up
21st Up
Harvest Ct. Comp
Harvest Ct. Comp
Harvest Ct. Comp
Harvest Ct. Up
Harvest Ct. Up
Harvest Ct. Up
Maple Comp
Maple Comp
Maple Up
Maple Up
Non-Ark Average
Ark Average

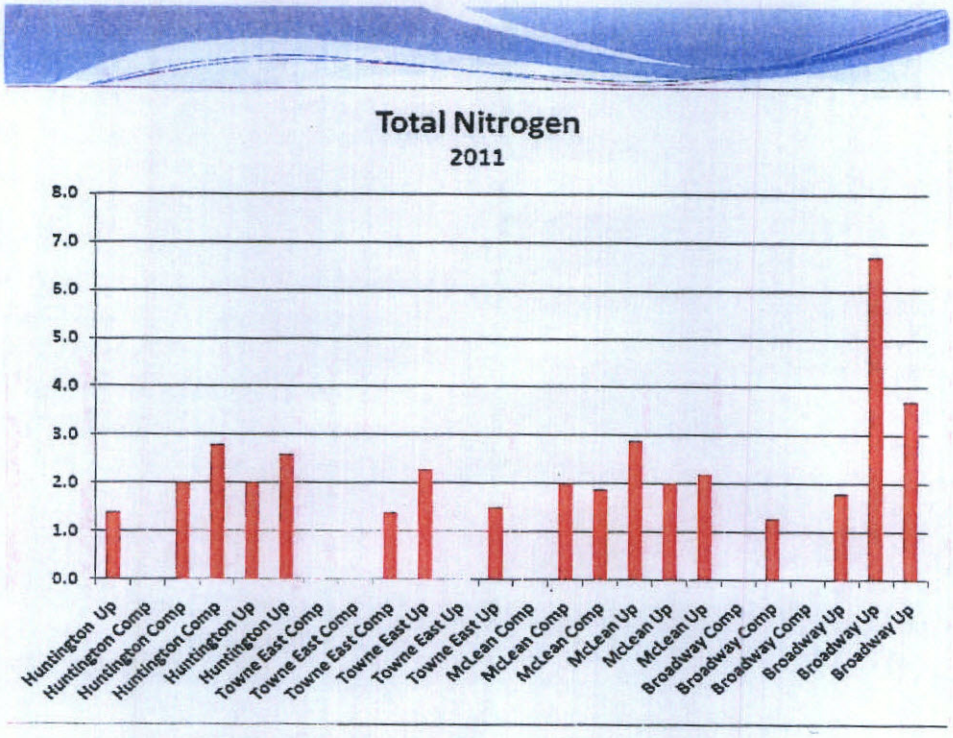


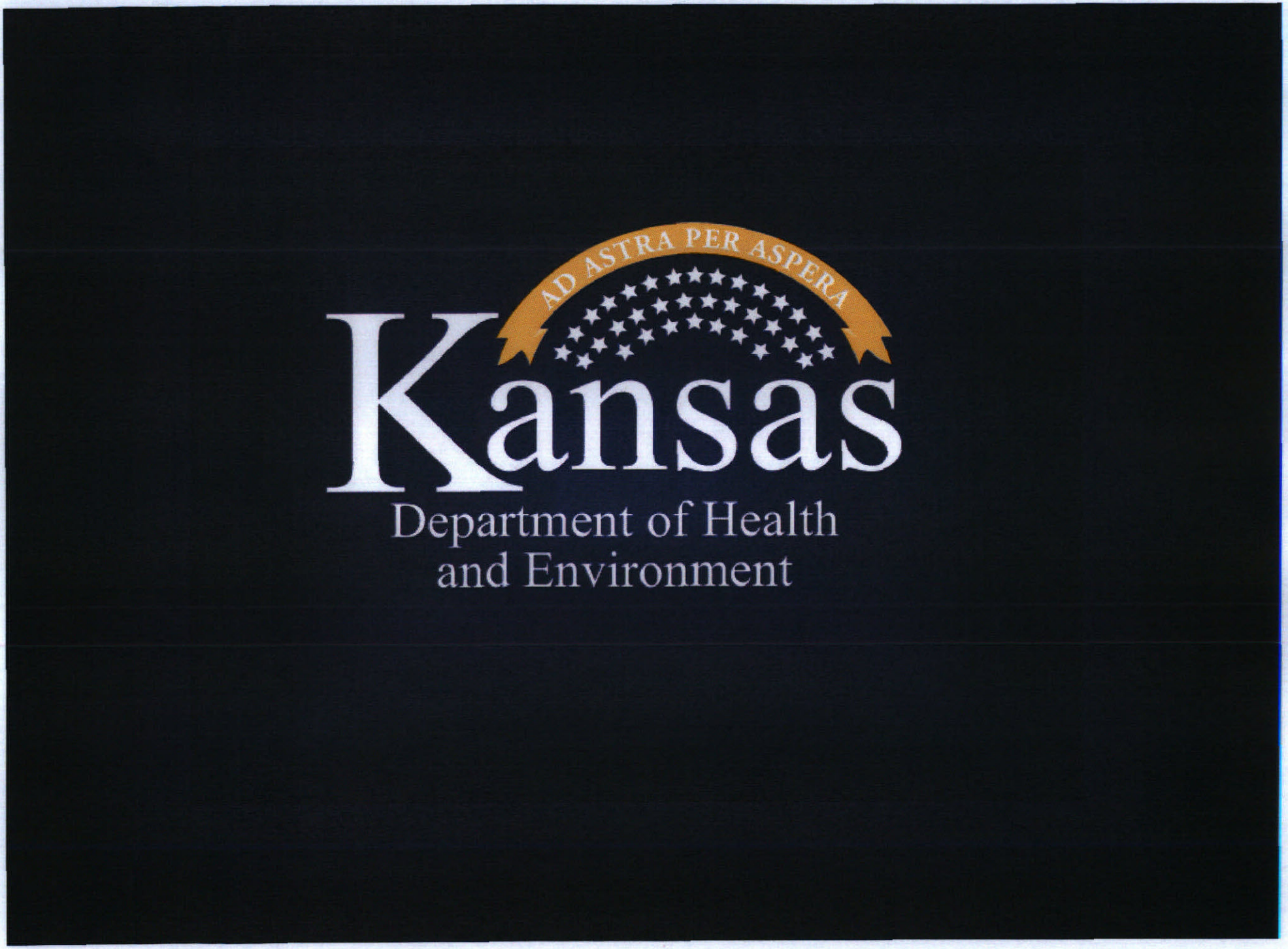
- What I have covered is the Who, What, and Where of the City of Wichita Wet Weather Sampling Program
- Outfalls vs. Streams/Rivers
- Tom Stiles, Chief of the KDHE Bureau of Water, Watershed Planning Section, will provide the broader perspective, and address the Why


BOD 2011
30
25
20
15
10
5
0
Huntington Up
Huntington Comp
Huntington Comp
Huntington Comp
Huntington Up
Huntington Up
Towne East Comp
Towne East Comp
Towne East Comp
Towne East Up
Towne East Up
Towne East Up
McLean Comp
McLean Comp
McLean Comp
McLean Up
McLean Up
McLean Up
Broadway Comp
Broadway Comp
Broadway Comp
Broadway Up
Broadway Up
Broadway Up


Total Phosphorous
2011
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
Huntington Up
Huntington Comp
Huntington Comp
Huntington Comp
Huntington Up
Huntington Up
Towne East Comp
Towne East Comp
Towne East Comp
Towne East Up
Towne East Up
Towne East Up
McLean Comp
McLean Comp
McLean Comp
McLean Up
McLean Up
McLean Up
Broadway Comp
Broadway Comp
Broadway Comp
Broadway Up
Broadway Up
Broadway Up


TSS
2011
250
200
150
100
50
0
Huntington Up
Huntington Comp
Huntington Grab
Huntington Grab
Huntington Up
Towne East Comp
Towne East Grab
Towne East Grab
Towne East Up
McLean Comp
McLean Comp
McLean Grab
McLean Up
McLean Up
Broadway Comp
Broadway Grab
Broadway Grab
Broadway Up

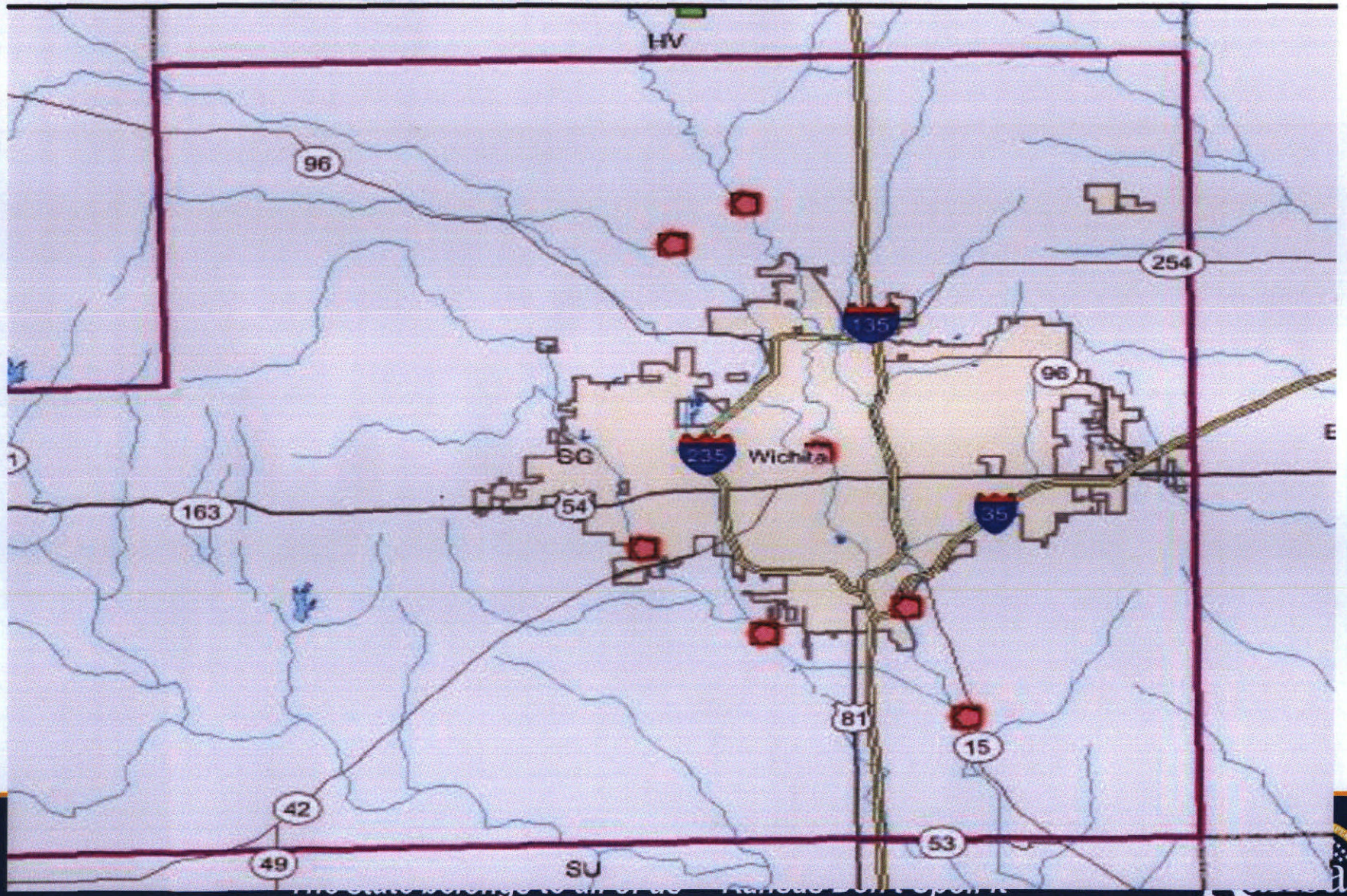

Total Nitrogen
2011
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Huntington Up
Huntington Comp
Huntington Comp
Huntington Comp
Huntington Up
Huntington Up
Towne East Comp
Towne East Comp
Towne East Up
Towne East Up
Towne East Up
McLean Comp
McLean Comp
McLean Comp
McLean Up
McLean Up
McLean Up
Broadway Comp
Broadway Comp
Broadway Comp
Broadway Up
Broadway Up
Broadway Up


AD ASTRA PER ASPERA
Kansas
Department of Health
and Environment

KDHE Sampling on Arkansas River at Wichita

Tom Stiles
Watershed Planning Section
Bureau of Water, KDHE

Kansas Department of Health and Environment
Bureau of Environmental Field Services
Water Quality Monitoring Sites



Kansas
Department of Health and Environment

1990-2011 Percentile Flows

Percentile	Maize	Valley Center	Wichita	Derby
25%	134 cfs	38 cfs	202 cfs	300 cfs
50%	286 cfs	67 cfs	418 cfs	537 cfs
75%	540 cfs	155 cfs	836 cfs	1090 cfs
WQ POR	1990-2011	1974-2011	2000-2011	1973-2011

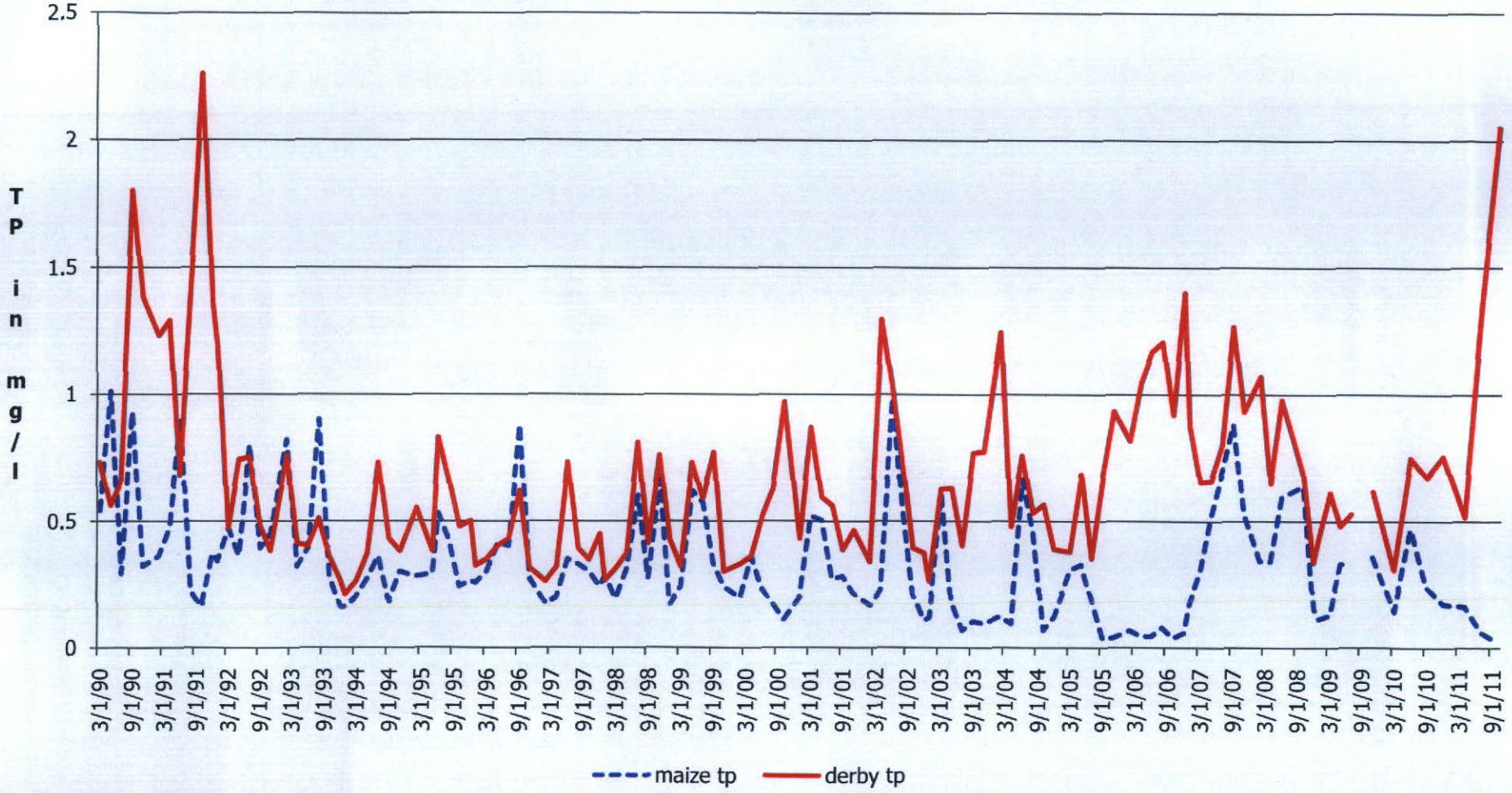
Period of Record Averages for TP &TSS

Pollutant	Maize	Valley Cntr	Wichita	Derby	Oxford
Phosphorus	329 ug/l	659 ug/l	350 ug/l	673 ug/l	535 ug/l
Total Susp Slds	90	117	113	108	147

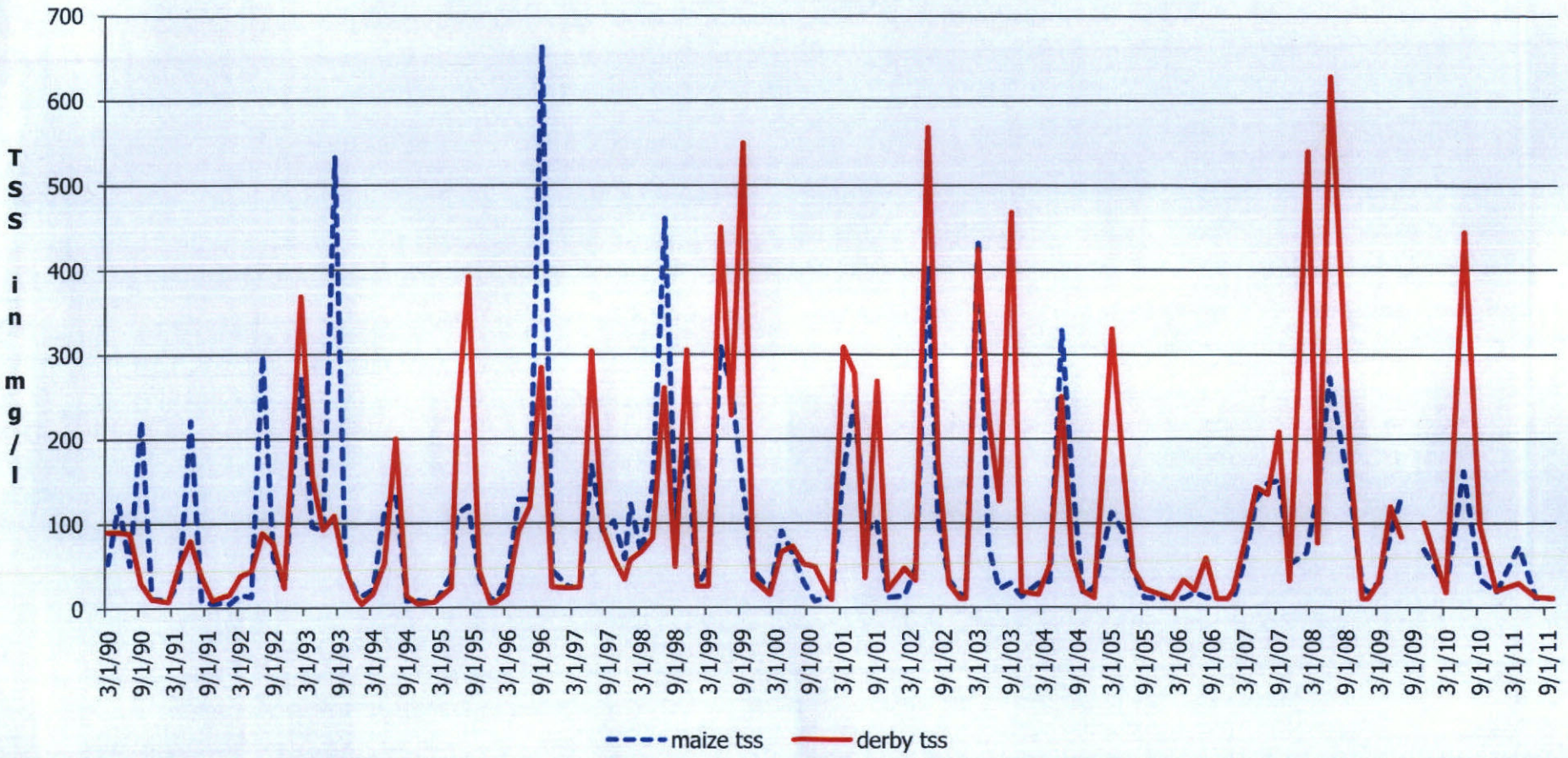
Flow Condition Averages for TP & TSS

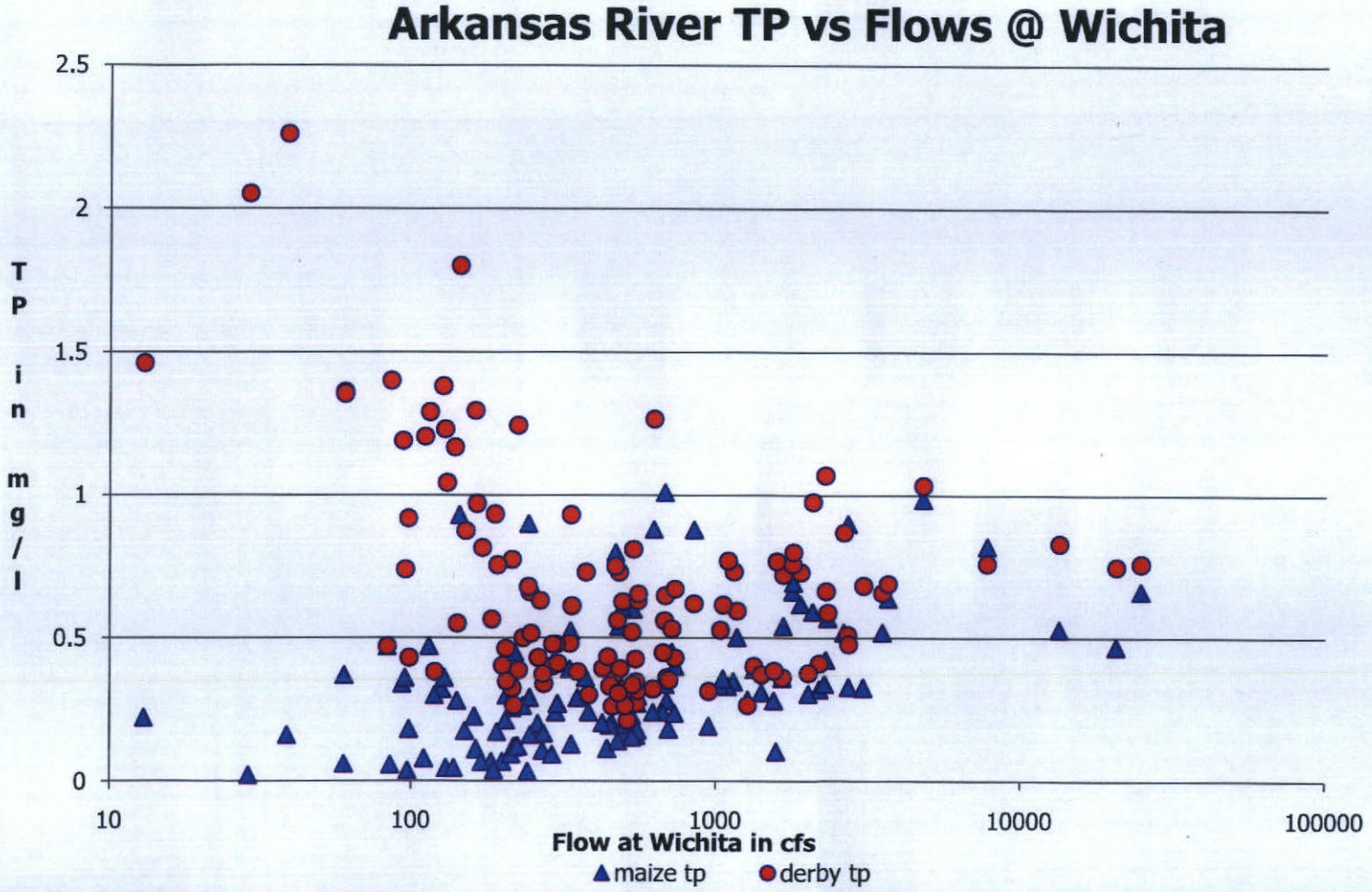
Condition	Maize	Valley Cntr	Wichita	Derby	Oxford
Wet TP	508 ug/l	759 ug/l	637 ug/l	639 ug/l	634 ug/l
Normal TP	301 ug/l	517 ug/l	277 ug/l	536 ug/l	419 ug/l
Dry TP	189 ug/l	807 ug/l	142 ug/l	1018 ug/l	652 ug/l
Wet TSS	202 mg/l	171 mg/l	268 mg/l	262 mg/l	340 mg/l
Normal TSS	65 mg/l	66 mg/l	60 mg/l	55 mg/l	73 mg/l
Dry TSS	15 mg/l	52 mg/l	23 mg/l	18 mg/l	49 mg/l

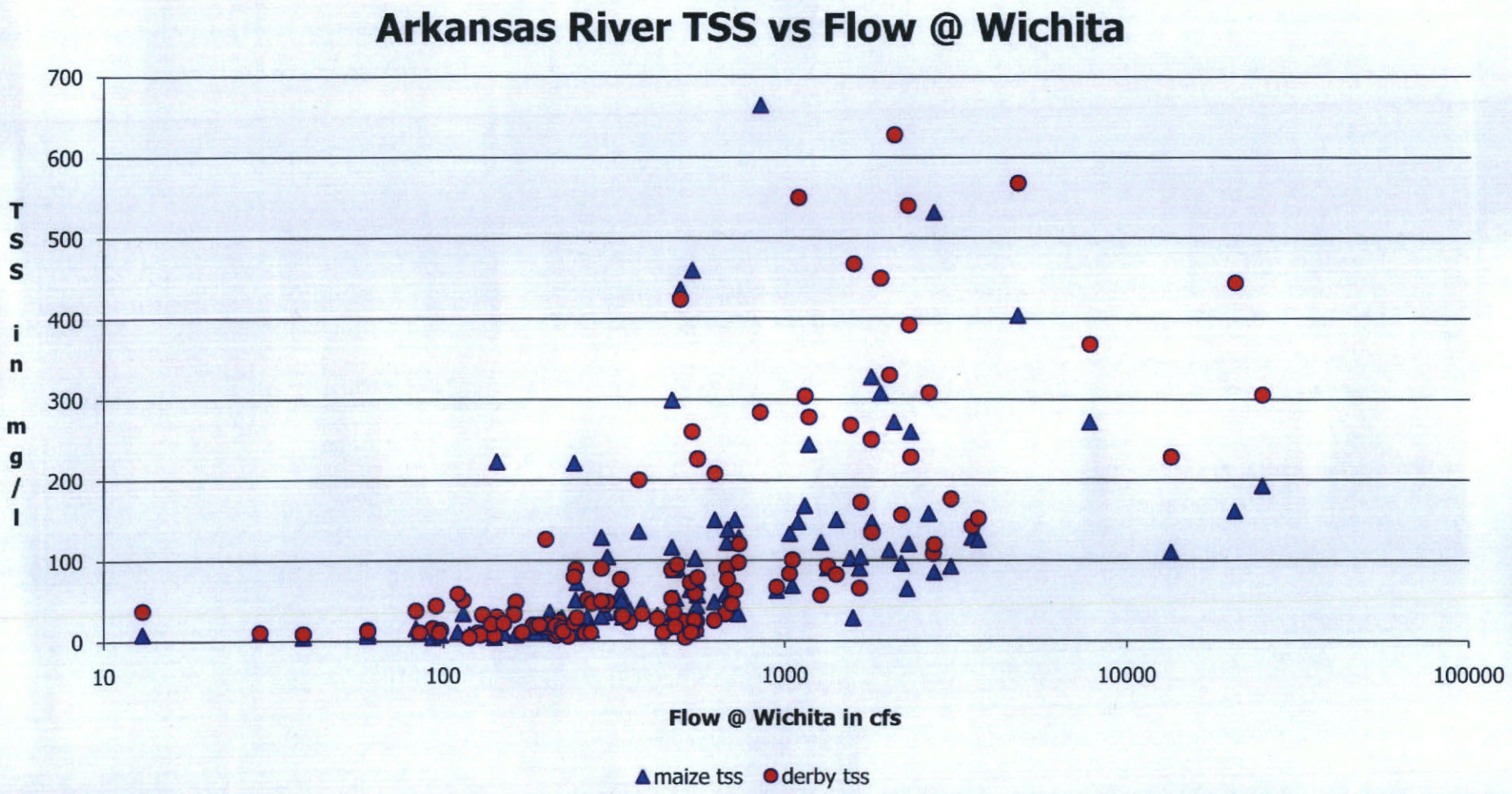
Arkansas River TP at Wichita over Time

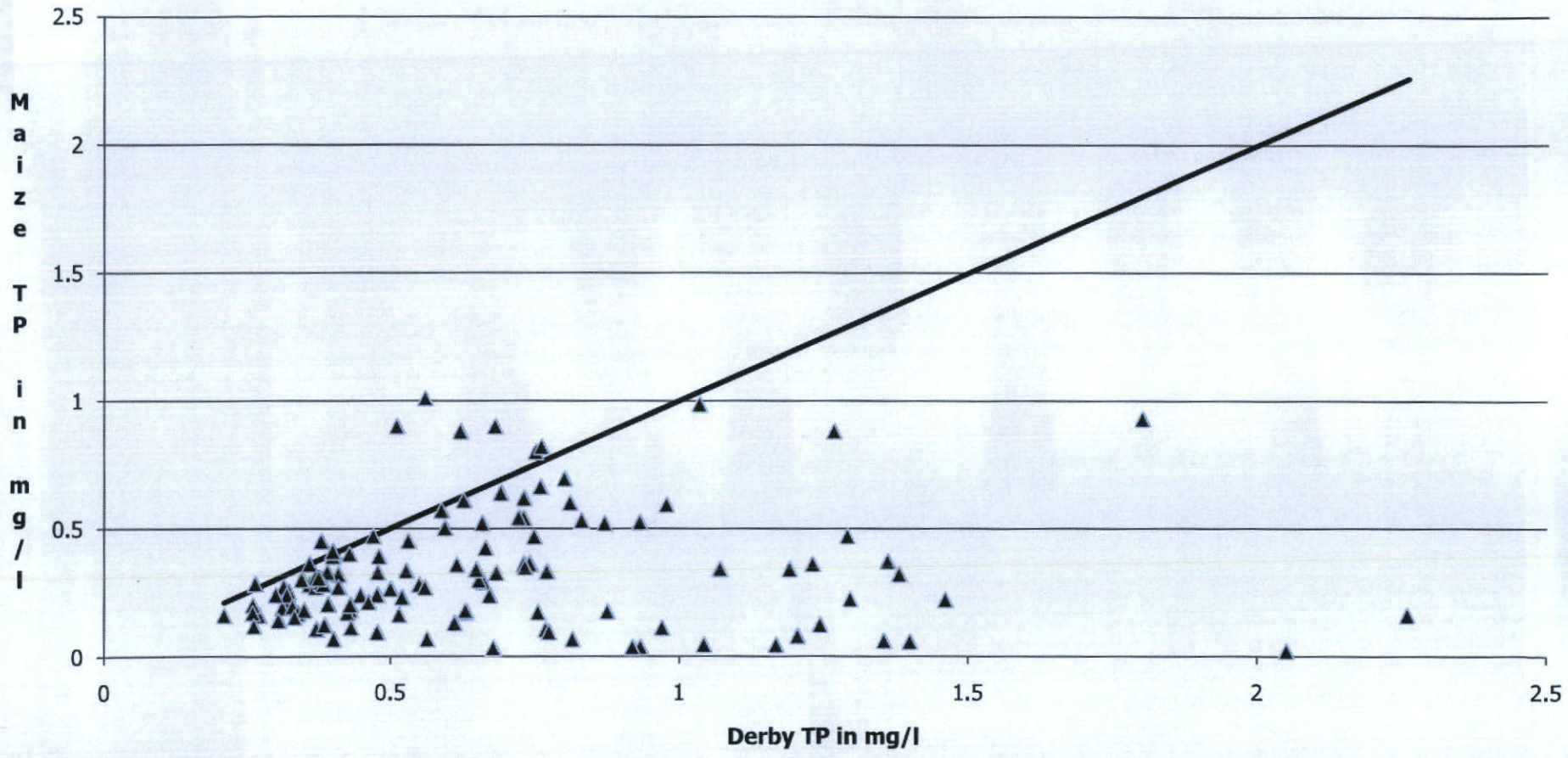


Arkansas River TSS at Wichita over Time

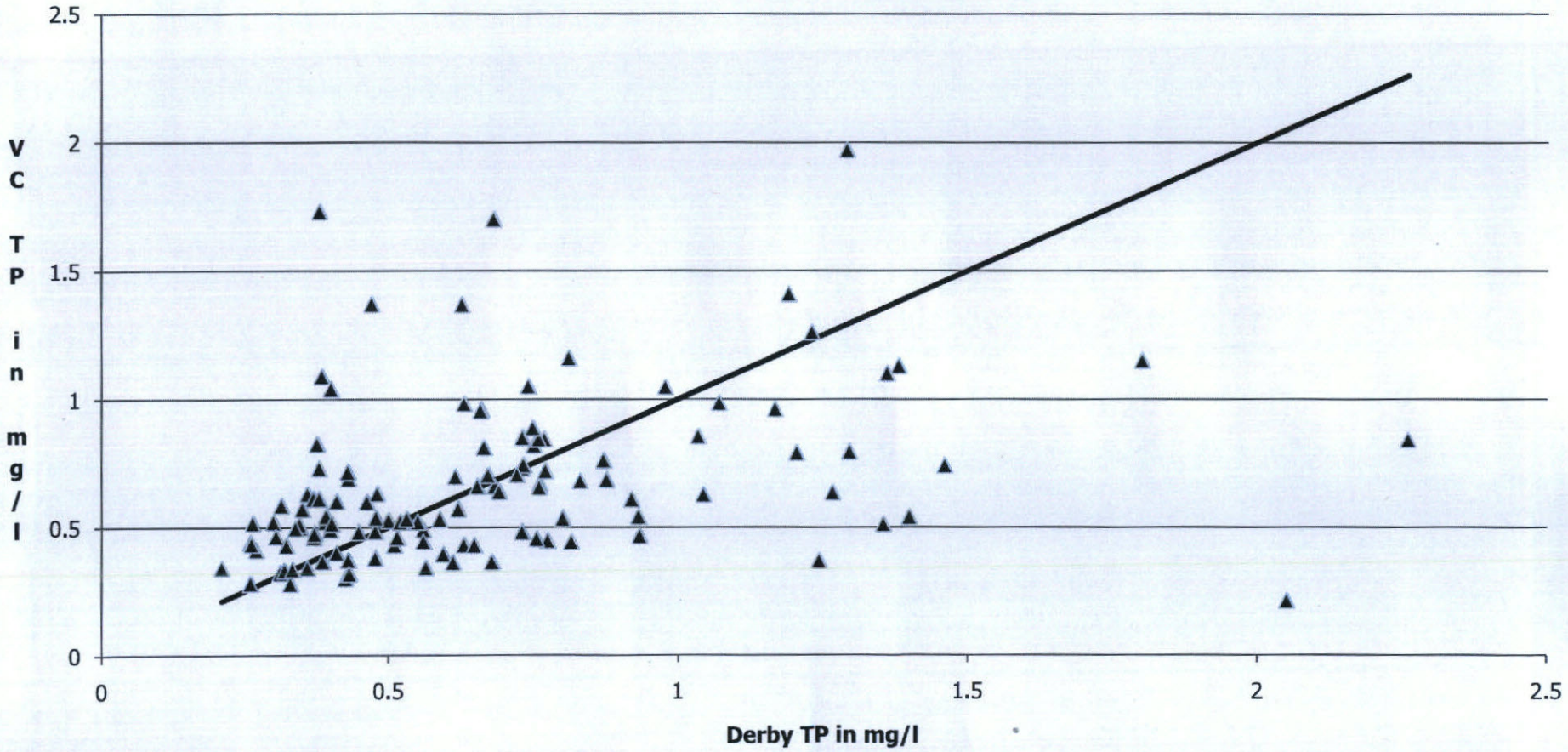


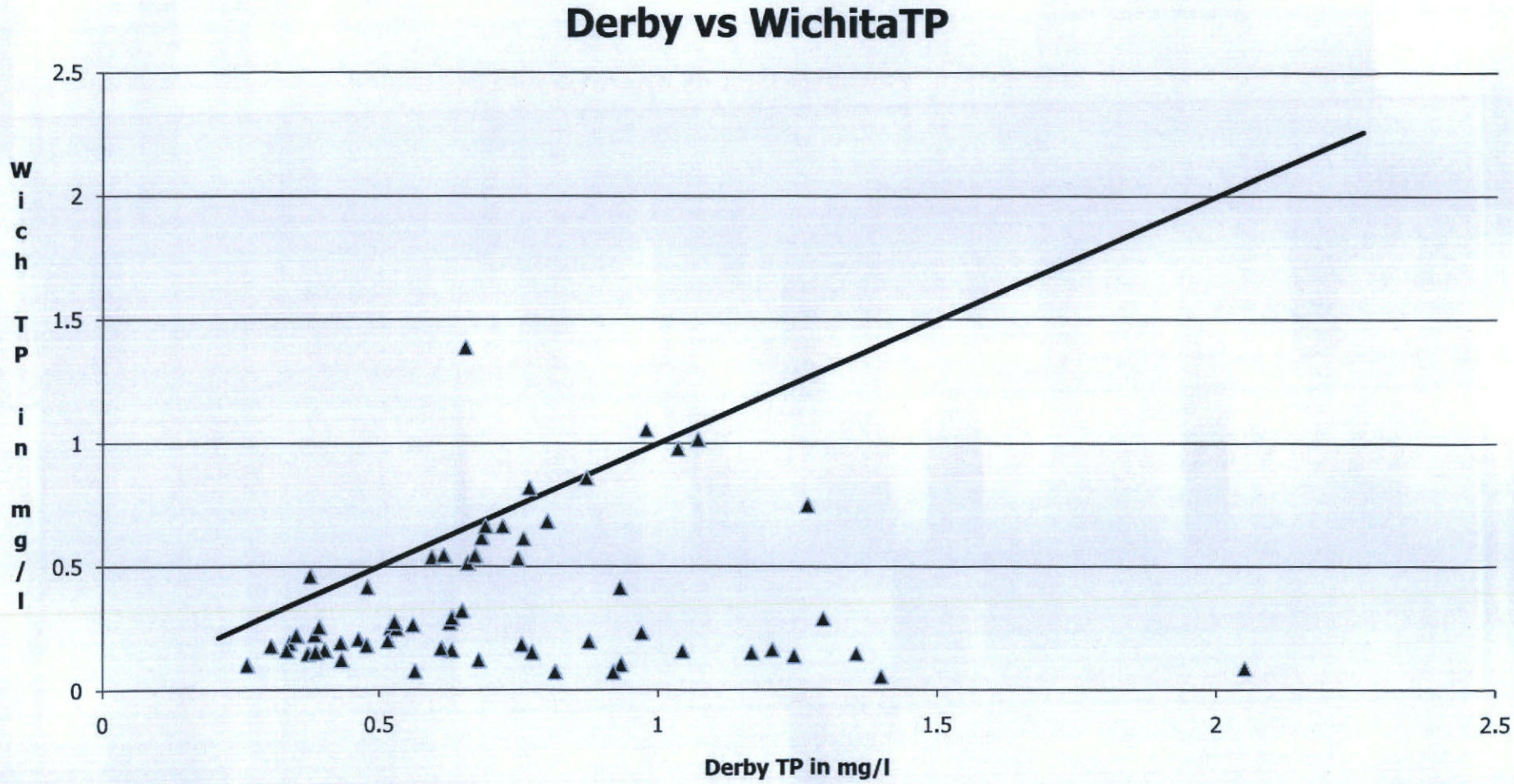

Arkansas River TP vs Flows @ Wichita
2.5
2
1.5
1
0.5
0
TP in mg/l
10
100
1000
10000
100000
Flow at Wichita in cfs
maize tp
derby tp

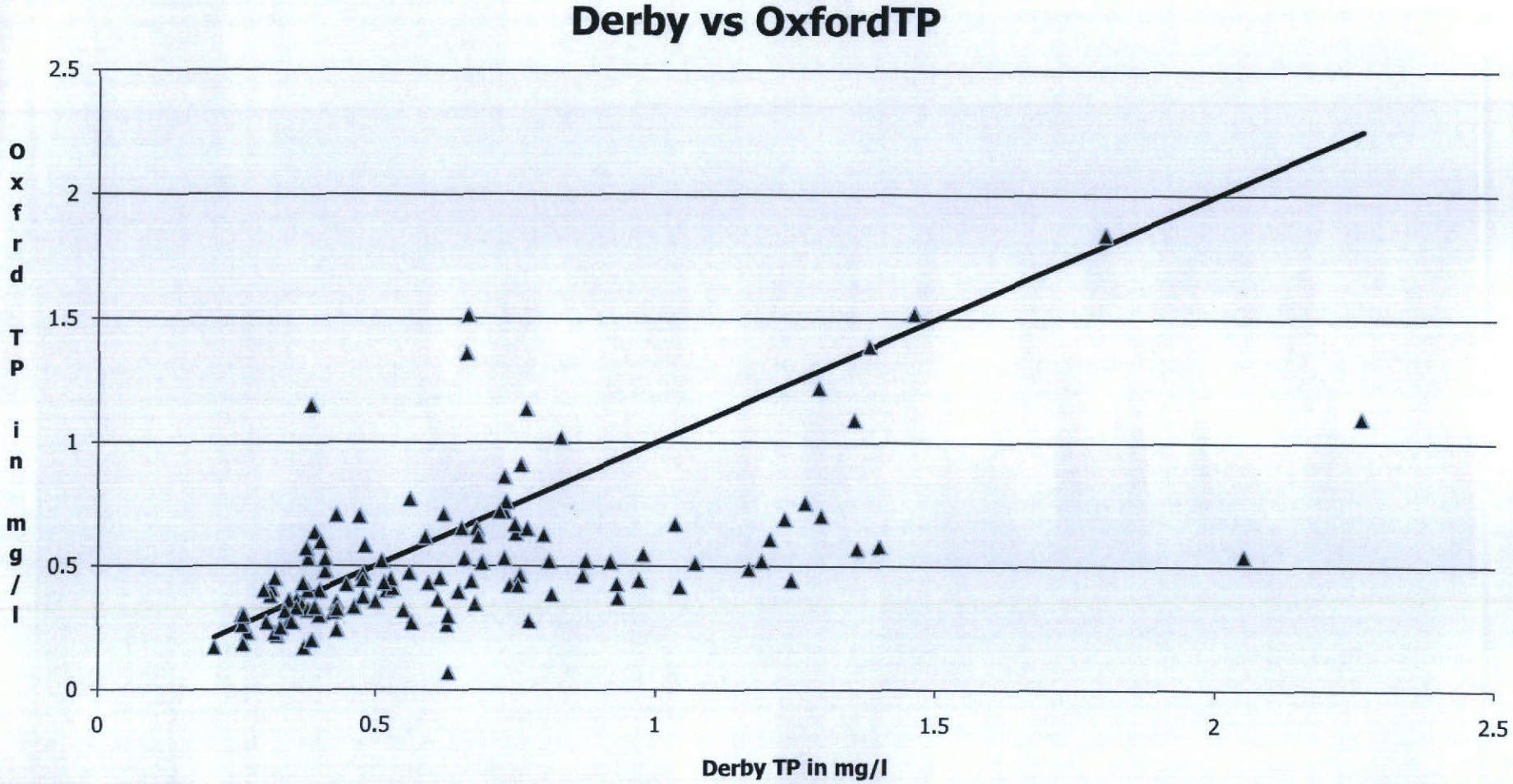

Arkansas River TSS vs Flow @ Wichita
700
600
500
400
300
200
100
0
TSS in mg/l
10
100
1000
10000
100000
Flow @ Wichita in cfs
maize tss
derby tss

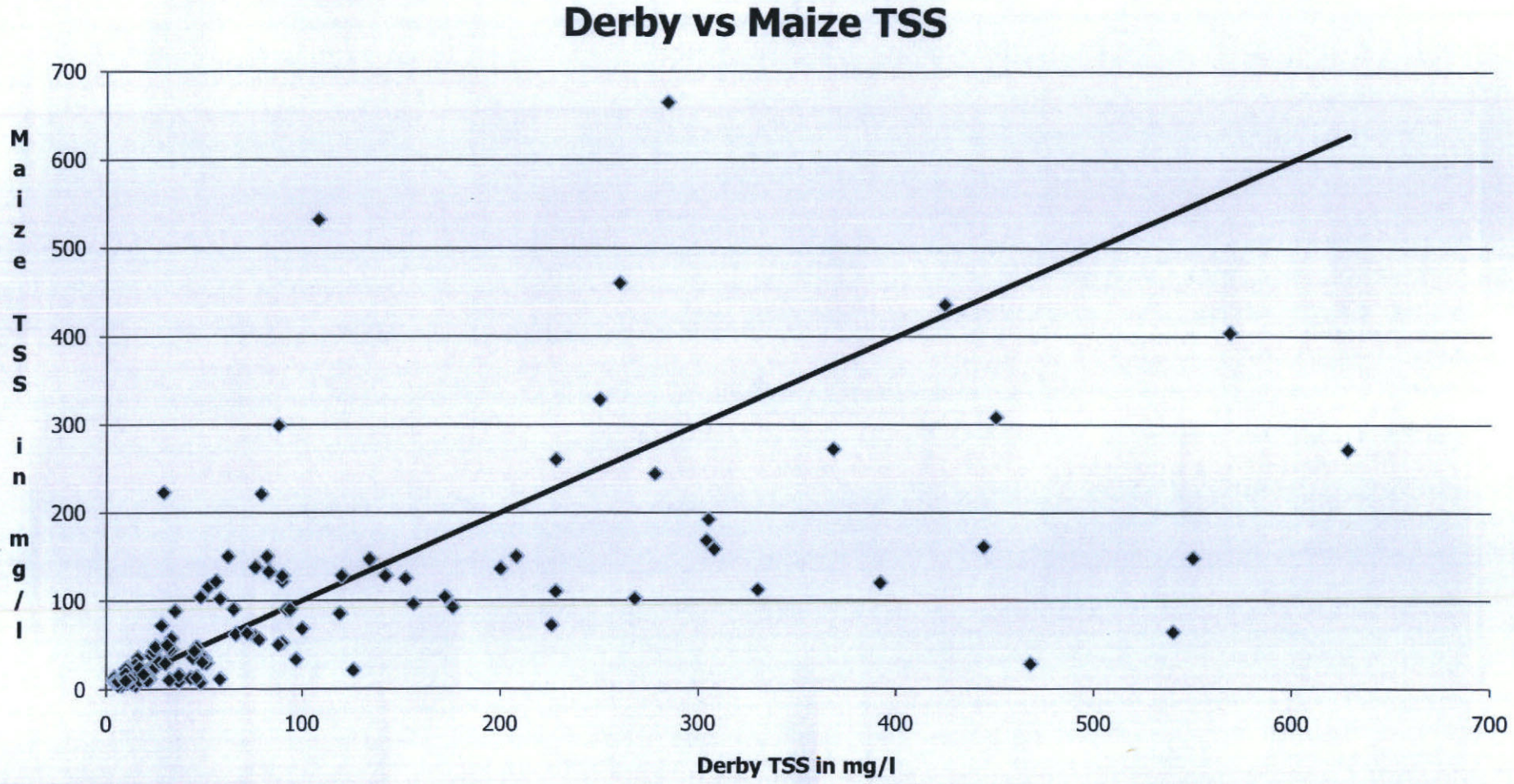

Derby vs Maize TP
Maize TP in mg/l
2.5
2
1.5
1
0.5
0
0
0.5
1
1.5
2
2.5
Derby TP in mg/l

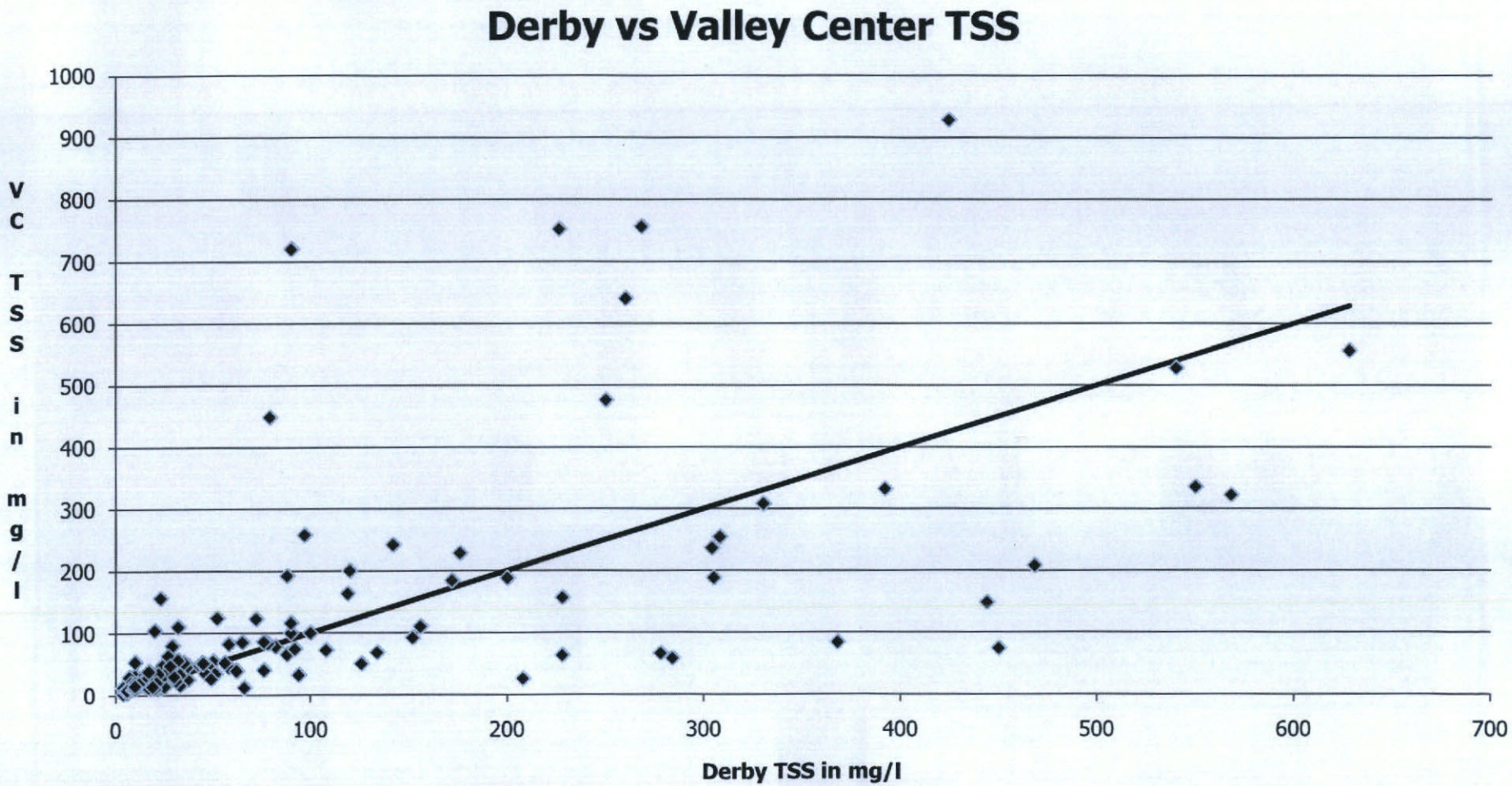
Derby vs Valley Center TP

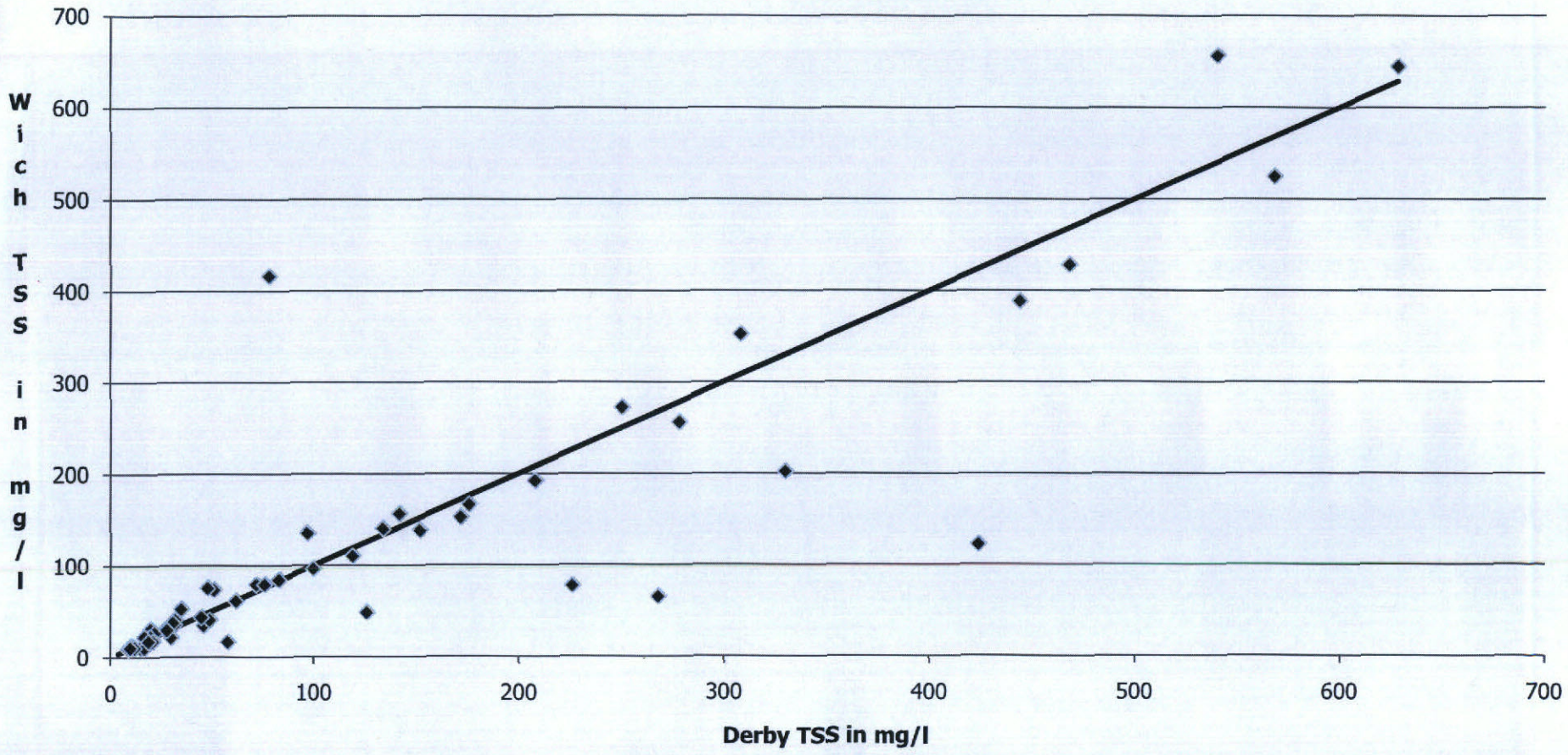



Derby vs WichitaTP
Wich TP in mg/l
2.5
2
1.5
1
0.5
0
0
0.5
1
1.5
2
2.5
Derby TP in mg/l

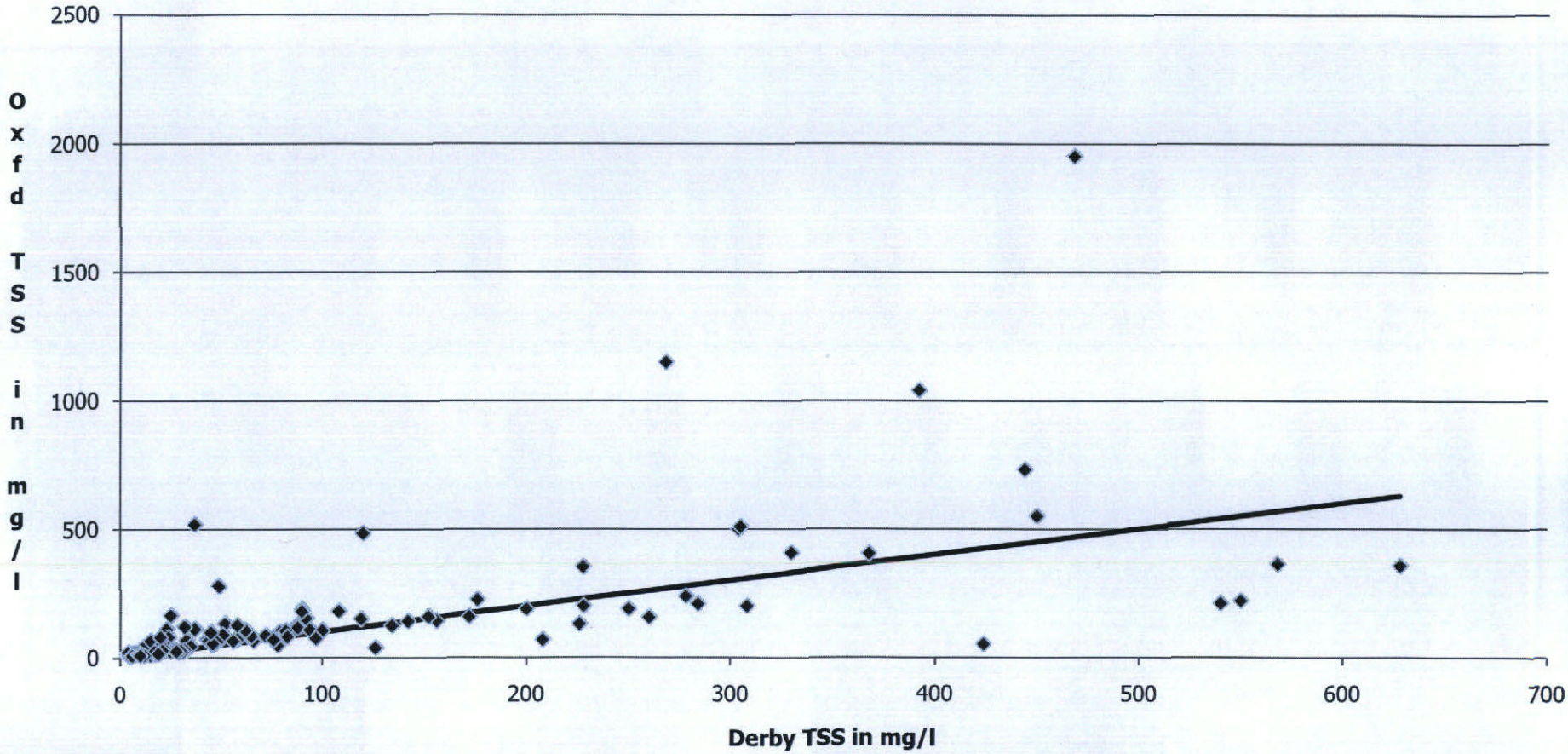

Derby vs OxfordTP
Oxfrd TP in mg/l
2.5
2
1.5
1
0.5
0
0
0.5
1
1.5
2
2.5
Derby TP in mg/l


Derby vs Maize TSS
Maize TSS in mg/l
0
100
200
300
400
500
600
700
Derby TSS in mg/l

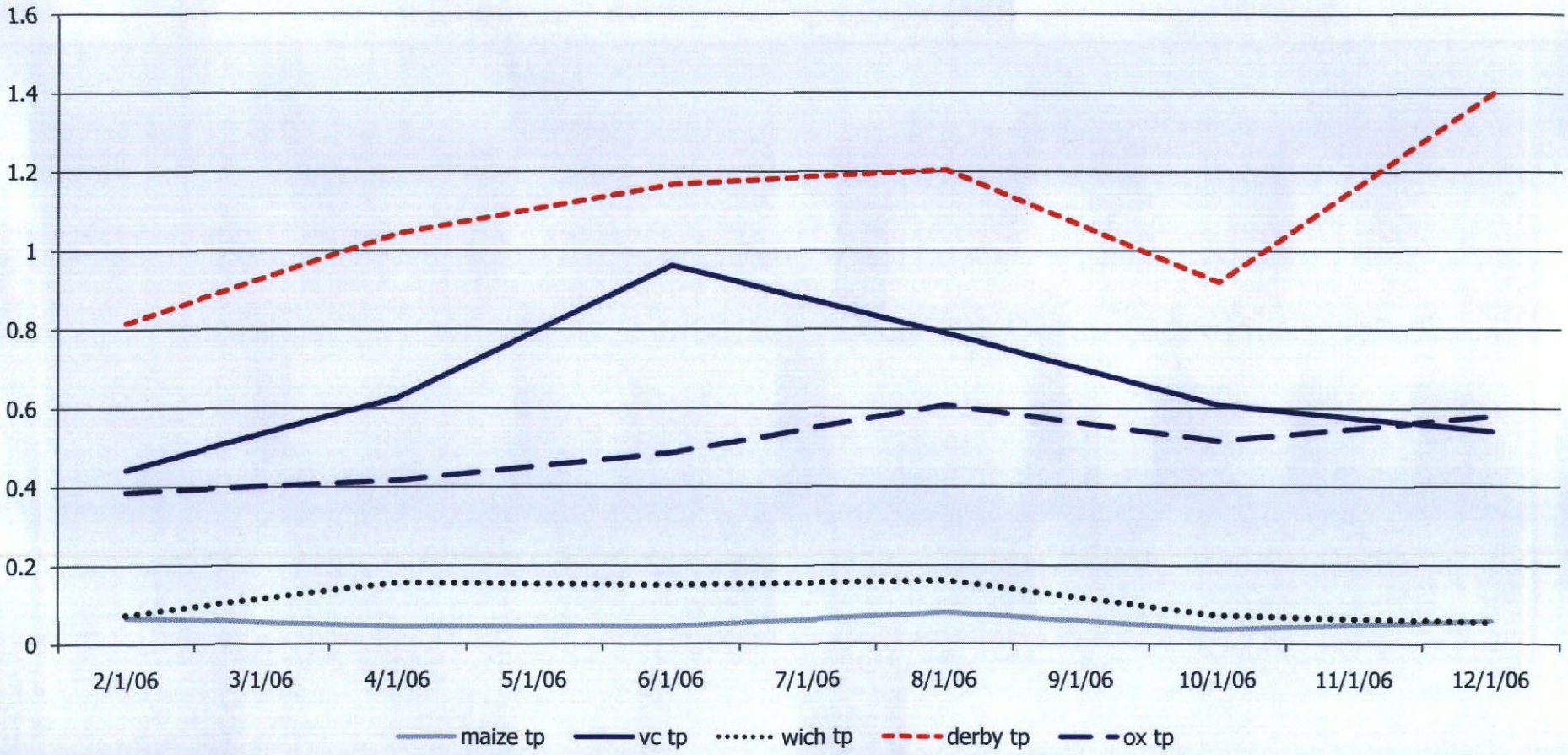

Derby vs Valley Center TSS
VC TSS in mg/l
1000
900
800
700
600
500
400
300
200
100
0
0
100
200
300
400
500
600
700
Derby TSS in mg/l


Derby vs WichitaTSS
Wich TSS in mg/l
700
600
500
400
300
200
100
0
0
100
200
300
400
500
600
700
Derby TSS in mg/l

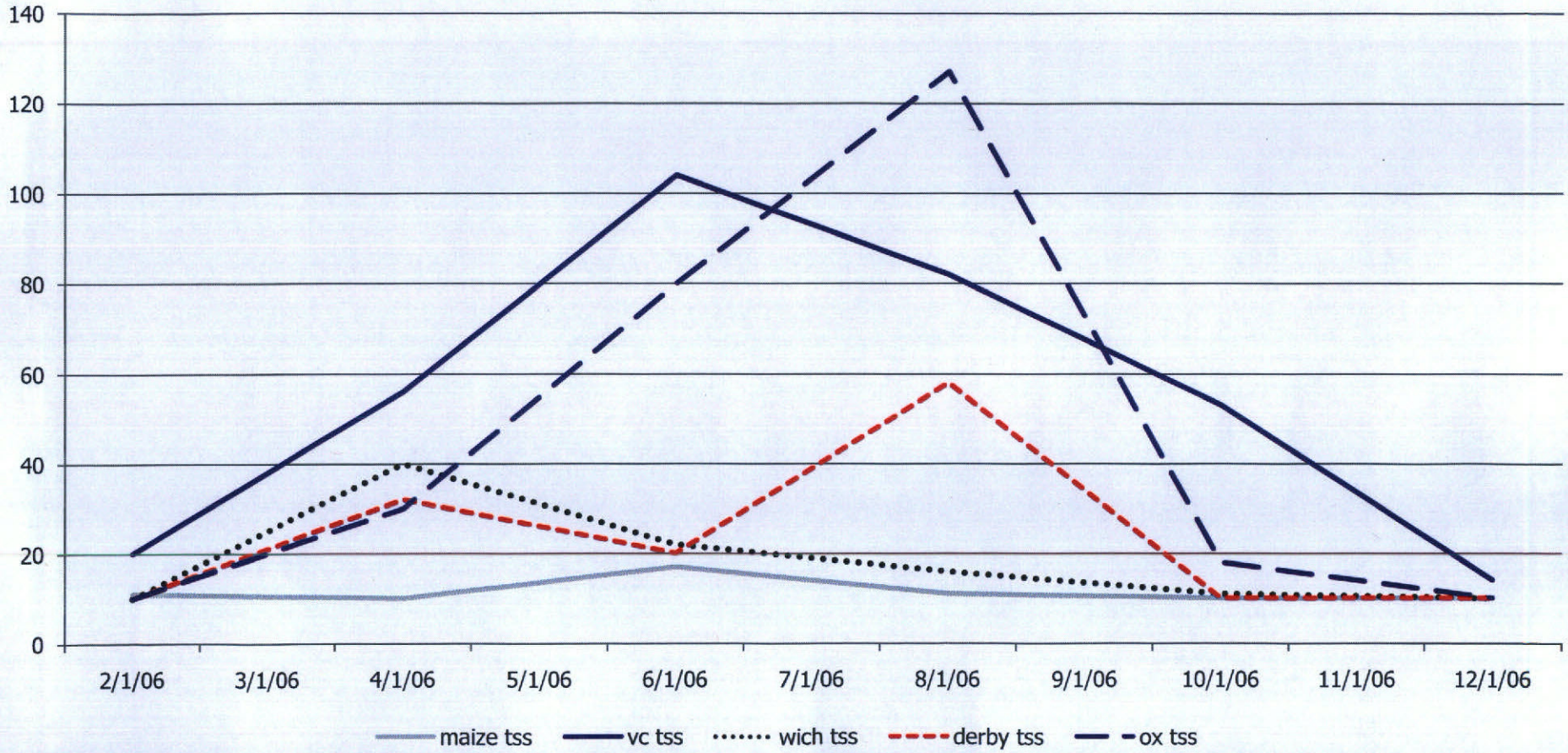
Derby vs OxfordTSS



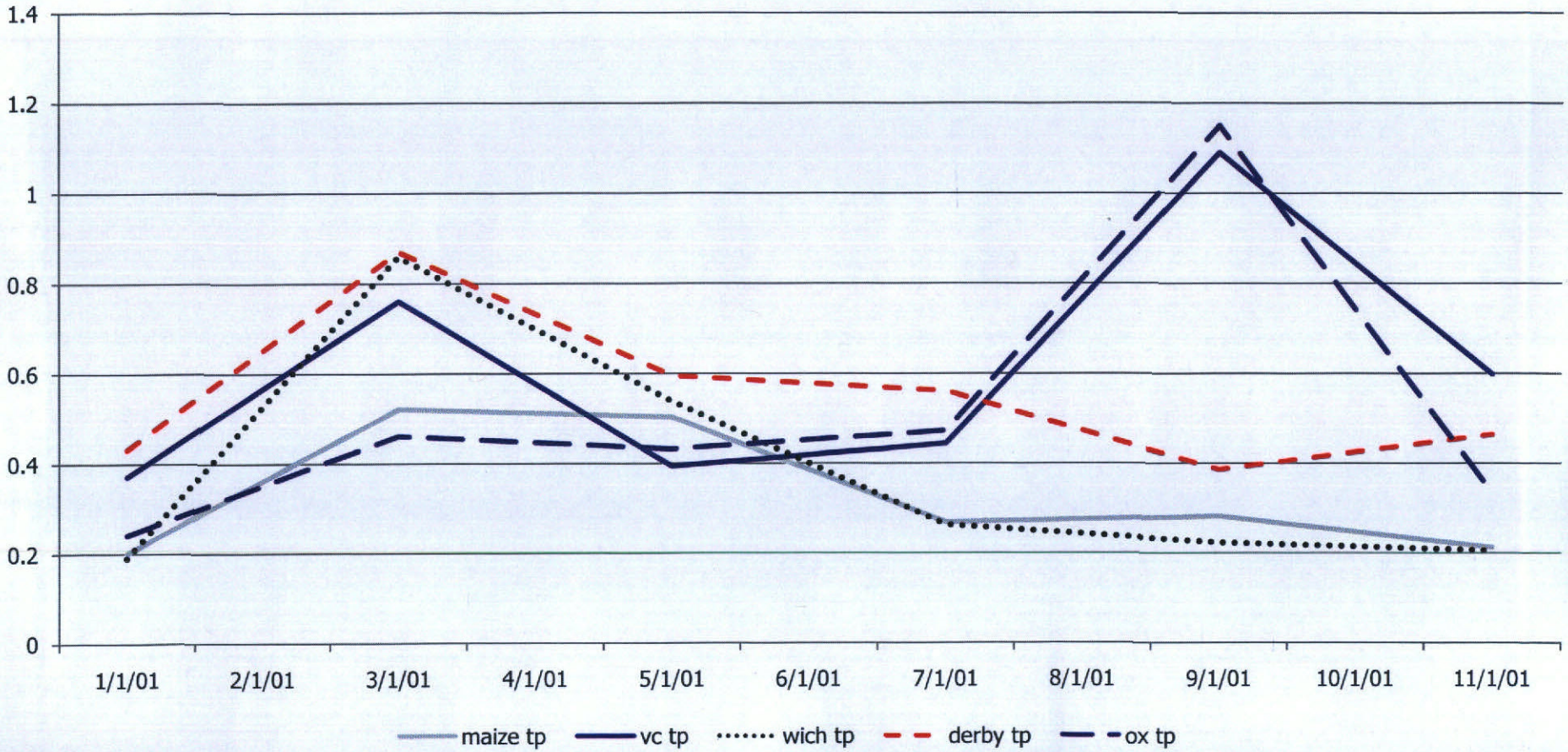
Wichita Area TP in 2006



Wichita Area TSS in 2006



Wichita Area TP in 2001



Wichita Area TSS in 2001